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FINAL STUDY AREA SCREENING EVALUATION ADDENDUM SITE 19 ON SHOTE
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TETRA TECH

STUDY AREA SCREENING EVALUATION ADDENDUM

for

**SITE 19 – ON-SHORE DERECKTOR
SHIPYARD**

NAVSTA, Newport, Rhode Island



**Naval Facilities Engineering Command
Mid-Atlantic**

**Contract Number N62470-08D-1001
Contract Task Order WE20**

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STUDY AREA SCREENING EVALUATION ADDENDUM
FOR
SITE 19 – ON-SHORE DERECKTOR SHIPYARD
NAVSTA, NEWPORT, RHODE ISLAND
COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

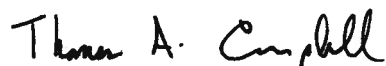
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ACRONYMS

ACH	air changes per hour
ATSDR	Agency for Toxic Substances and Disease Registry
ADAFs	age-dependent adjustment factors
B&RE	Brown & Root Environmental
bgs	below ground surface
BRAC	Base Realignment and Closure
BTV	background threshold value
Cal EPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	Chemicals of concern
COPC	chemicals of potential concern
CSF	cancer slope factor
CSM	conceptual site model
CTE	central tendency exposure
CTO	Contract Task Order
DAF	dilution attenuation factor
DEC	direct exposure criteria
DO	dissolved oxygen
DPT	direct push technology
DRO	diesel range organics
EPC	exposure point concentration
EU	exposure unit
FS	Feasibility Study
Ft.	feet

GC/FID	gas chromatography/flame ionization detector
GRO	gasoline range organics
HEAST	Health Effects Assessment Summary Tables
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
HSA	hollow stem auger
ID	inside diameter
IEUBK	Integrated Exposure Uptake Biokinetic
ILCR	incremental lifetime cancer risk
IRIS	Integrated Risk Information System
IUR	inhalation unit risks
L	liter
LNAPL	light non-aqueous phase liquids
LPDE	low density polyethylene
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
ml/min	milliliters per minute
MRL	Minimal Risk Level
mw	monitoring well
NAD	North American Datum
NAVSTA	Naval Station
Navy	U.S. Department of Navy
NCEA	National Center for Environmental Assessment
NGVD	National Geodetic Vertical Datum
NTCRA	Non-time critical removal action
NTU	Nephelometric Turbidity Units
NUSC	Naval underwater Systems Center

OD	outside diameter
OHM	OHM Corporation
ORNL	Oak Ridge National Laboratory
ORP	oxidation-reduction potential
PA	Preliminary Assessment
PAH	polynuclear aromatic hydrocarbon
PAL	project action levels
PCB	Polychlorinated biphenyl
PE	Polyethylene
PEF	particulate emissions factor
PID	photoionization detector
ppm	parts per million
PPRTVs	Provisional Peer Reviewed Toxicity Values
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
RAGS	Risk Assessment Guidance for Superfund
RBC	risk-based concentration
RCRA	Resource Conservation Recovery Act
RDA	recommended daily allowance
RDI	recommended daily intake
RfC	reference concentration
RfD	reference dose
RI	Rhode Island
RIDEM	Rhode Island Department of Environmental Management
RME	reasonable maximum exposure
RSLs	Regional Screening Levels
SASE	Study Area Screening Evaluation
SG	soil-gas

SOPs	standard operation procedures
SSL	soil screening level
SVOC	semi-volatile organic compounds
TAL	Target Analyte List
TCLP	toxicity characteristic leaching procedure
TEF	toxicity equivalent factors
TP	test pit
TPH	total petroleum hydrocarbon
Tetra Tech	Tetra Tech, Inc.
UCL	upper confidence limit
UPL	Upper Predictive Limit
USCG	U.S. Coast Guard
USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
USMC	U.S. Marine Corps
UST	underground storage tanks
VDEQ	Virginia Department of Environmental Quality
VF	volatilization factor
VISL	Vapor Intrusion Screening Level
VOC	volatile organic compounds
yr	year
µg/L	micrograms per liter
µg/kg	micrograms per kilogram

EXECUTIVE SUMMARY

This Study Area Screening Evaluation (SASE) Addendum was prepared by Tetra Tech, Inc., (Tetra Tech) for the U.S. Department of Navy (Navy) to document onshore field work conducted as part of additional sampling activities for Site 19, On-Shore Dorecktor Shipyard (the Site) at Naval Station (NAVSTA) Newport, Rhode Island. This report is an addendum to the *On-Shore Site Assessment Screening Evaluation, Former Dorecktor Shipyard, Naval Education & Training Center, Newport, Rhode Island* (Brown and Root Environmental [B&RE], 1997). The objectives of this SASE Addendum are to obtain analytical data where data gaps were identified by the Navy and regulatory agencies. Analytical data were used to revise the 1997 SASE human health risk assessment (HHRA) and to provide a recommendation on a path forward for the Site.

The Site consists of undeveloped areas, foundations of former buildings, temporary offices, parking areas, storage areas utilized by the U.S. Coast Guard (USCG) for buoy maintenance, and on-going construction projects (USCG Buoy Tender Waterfront). The 1997 SASE divided the Site into five subareas; the Northern Waterfront, the Central Shipyard, the polychlorinated biphenyl (PCB) removal area, the Building 234 Area, and the Southern Waterfront.

The Site was utilized by the Navy for shipbuilding activities from 1962 to 1978, and subsequently by a privately operated ship maintenance and construction facility from 1979 to 1992. A Preliminary Assessment (PA) was conducted in May 1993 that identified several areas of concern where additional investigations were recommended. In 1997 a SASE was completed which included soil and groundwater sampling activities. The SASE summarized analytical data and calculated risk to human health through the completion of a baseline HHRA. Recommendations included excavation of "hot spots" and filling of sumps and trenches. Various removal actions were conducted from 1997 to 2007 to address the recommendations contained in the SASE Report.

Analytical results of the 2011 soil, groundwater, and soil gas samples collected from the five areas of the Site are summarized as follows. Soil samples in the Southern Waterfront contained six metals above U.S. Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs). Volatile organic compounds (VOCs) were detected in groundwater with trichloroethene (TCE) exceeding the USEPA maximum contaminant level (MCL) in five Northern Waterfront wells. In the Central Shipyard, arsenic in groundwater was detected above the MCL. Soil samples collected in the PCB removal area documented PCB, polynuclear aromatic hydrocarbons (PAHs), and metals above RSLs. Soil samples collected in the Northern Waterfront detected PAHs and metals above RSLs and soil gas samples detected five VOCs above USEPA soil gas criteria.

The SASE HHRA was revised using historical soil data and current soil, groundwater and soil gas data. Arsenic was the major contributor to the hazard index (HI) for hypothetical child residents exposed to subsurface soil at the PCB removal area. TCE was the major contributor to the HI for hypothetical child and adult residents exposed to groundwater at the North Waterfront. Manganese was the major contributor to the HI for future industrial workers exposed to groundwater at the Central Shipyard. Arsenic, cobalt, iron, and manganese were the major contributor to the HI for hypothetical child and adult residents exposed to groundwater at the Central Shipyard. Manganese was the major contributor to the HI for hypothetical child residents exposed to groundwater at former Building 234.

Cancer risks exceeding USEPA cancer risk range (10^{-4} to 10^{-6}) was determined for hypothetical residents in one area for groundwater and in two areas for soil. In addition, cancer risks exceeding the RIDEM cancer risk threshold of 10^{-5} was determined for hypothetical receptors in each area and for current industrial workers in two areas and future industrial workers in three areas, and future trespassers in the PCB Removal Area.

The following table summarizes carcinogenic risks that exceed the USEPA cancer target risk range.

Area	Medium	Receptor	Contaminant Contributing to Cancer Risk
Central Shipyard	Groundwater	Future Industrial Workers (2E-04) Hypothetical Child Residents (6E-04) Hypothetical Adult Residents (1E-03) Hypothetical Lifelong Residents (2E-03)	Arsenic
Building 234	Surface Soil	Hypothetical Child Residents (3E-04) Hypothetical Lifelong Residents (4E-04)	PAHs, arsenic, chromium
PCB Removal Area	Surface Soil	Hypothetical Child Residents (5E-04) Hypothetical Lifelong Residents (5E-04)	PAHs, arsenic
	Subsurface Soil	Hypothetical Lifelong Residents (2E-04)	PAHs, arsenic, chromium

The On-Shore Derecktor Site is currently located on an active portion of NAVSTA Newport. Several construction projects are being conducted at the site to improve the site for future Navy and USCG use. Future land use will not include residential use due to the industrial nature of the site and on-going Navy infrastructure constructions plans.

The conclusions of the risk assessment determined that risk under the residential use scenario is present for soil and groundwater. Risk under the future industrial user scenario is present due to inadvertent ingestion of groundwater containing arsenic and manganese. Several removal actions have been conducted at the site to remove sources of contamination present from previous site uses.

This SASE Addendum fulfills the role of a Remedial Investigation for this site because this report, coupled with the previous SASE report, contains the risk assessment component required by CERCLA. Based on the risks estimated for the residential and industrial workers scenarios, it is recommended that the Site be carried forward to a Feasibility Study (FS) step which will evaluate remedial alternatives for soil and groundwater.

1.0 INTRODUCTION

This Study Area Screening Evaluation (SASE) Addendum was prepared by Tetra Tech, Inc., (Tetra Tech) for the U.S. Department of Navy (Navy) to document onshore field work conducted as part of additional sampling activities for Site 19, On-Shore Derecktor Shipyard (the Site) at Naval Station (NAVSTA) Newport, Rhode Island. This addendum is a supplement to the *On-Shore Site Assessment Screening Evaluation, Former Derecktor Shipyard, Naval Education & Training Center, Newport, Rhode Island* (B&RE, 1997). Tetra Tech is conducting this work at the request of the Navy under Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62470-08-D-1001, Contract Task Order (CTO) WE20.

The Site was utilized by the Navy for shipbuilding activities from 1962 to 1978, and subsequently by a privately operated ship maintenance and construction facility from 1979 to 1992. In May 1993 a Preliminary Assessment (PA) was conducted by Halliburton NUS Corporation and ENSR Consultants and Engineers. The PA identified several areas of concern, identified by visual observations and a review of historical records for the Site, where additional investigations were recommended. Soil and groundwater sampling activities were conducted throughout the Site as part of the SASE completed in 1997. The SASE summarized analytical data and calculated risk to human health through the completion of a baseline human health risk assessment (HHRA). Recommendations generated from the SASE included excavation of “hot spots” and filling of existing sumps and trenches. Various removal actions were conducted from 1997 to 2007 to address the recommendations contained in the SASE Report.

1.1 SITE LOCATION

The On-Shore Derecktor Shipyard is located at NAVSTA Newport, adjacent to the eastern portion of Coddington Cove, Narragansett Bay, as illustrated in Figure 1-1. The Site consists of undeveloped areas, relic foundations of former buildings, temporary offices, parking areas, storage areas utilized by the U.S. Coast Guard (USCG) for buoy maintenance, and on-going construction projects (USCG Buoy Tender Waterfront) as depicted in Figure 1-2. Additional site information regarding the operational history of activities at the Site can be found in the 1997 SASE Report (Brown & Root Environmental [B&RE] 1997).

1.2 PROJECT OBJECTIVES

The project objectives of the SASE Addendum are to collect additional samples and obtain analytical data from areas where data gaps were identified by the Navy, the U.S. Environmental Protection Agency (USEPA) and the Rhode Island Department of Environmental Management (RIDEM). This data and historical site data will be used to revise the 1997 baseline HHRA and to provide recommendations for any additional work for the Site.

Additional groundwater and soil analytical data was generated from five areas of the Site which included the following:

- Southern Waterfront
- Building 234 Area
- Central Shipyard (Building 42)
- Polychlorinated biphenyl (PCB) Removal Area (Building 6/Test Pit 14 Area and Transformer Bank)
- Northern Waterfront (includes the Huts 1 and 2 Area)

The baseline HHRA was revised to incorporate changes in the risk assessment methodology since the original HHRA was prepared according to current Navy and USEPA risk assessment guidance documents. In addition, the vapor intrusion pathway is evaluated, through the collection of soil gas samples from the Northern Waterfront.

1.3 SASE ADDENDUM REPORT ORGANIZATION

This SASE Addendum serves to supplement the 1997 SASE Report and, as such, the reader is referred to the 1997 SASE Report for detailed information on the background and operational history of the site, previous investigations (e.g. PA), geology and hydrogeology, and fate and transport of contaminants.

This SASE Addendum is organized into six sections, with tables and figures presented following the document text:

- Section 1.0 of the report outlines the project objectives and the organization of the SASE Addendum Report.
- Section 2.0 provides a discussion of the 1997 SASE findings along with an overview of the removal activities previously conducted at the Site.

- Section 3.0 presents an overview of the field investigations conducted as part of this SASE Addendum designed to assess existing data gaps in environmental media quality at the Site.
- Section 4.0 presents an assessment of environmental media impacts from contamination identified at the Site.
- Section 5.0 presents the results of the baseline HHRA.
- Section 6.0 provides the summary and conclusions from investigation efforts conducted under this SASE Addendum.

2.0 PREVIOUS SITE ACTIVITIES

This section presents a summary of previous environmental investigations conducted at the Site.

2.1 1997 SASE INVESTIGATION

The SASE investigation was conducted to determine the presence of contaminants in the soils and groundwater in the areas of concern previously identified by the Derecktor Shipyard PA (Halliburton NUS, 1993). As part of this investigation, 28 test pits were excavated and 25 soil borings were advanced, eight of which were completed as permanent groundwater monitoring wells. Soils were evaluated using field-screening instruments and visual observations, and samples of suspect soils were delivered to an analytical laboratory for chemical analysis and reporting. In addition, eight groundwater samples were collected and submitted for laboratory analysis and reporting.

Findings of the SASE Investigation

Soil sample analysis confirmed the conclusions of the PA that surficial discharge of various contaminants had occurred at several locations across the Site. Much of the contamination in site soils was localized and apparently related to surficial releases. Low concentrations of contaminants were also detected in groundwater samples collected at the Site. The SASE findings are summarized below:

- Elevated concentrations of phenolic compounds and polynuclear aromatic hydrocarbon (PAH) compounds were detected in soil samples from test pit (TP) 16 and TP17 in the area around two structures (Huts 1 and 2). The evaluation of data determined that the contaminants were likely associated with the former vehicle maintenance operations that were performed in this location.
- Elevated concentrations of PCBs, PAHs, and metals were found in soils from unpaved areas northeast of Building 6 (TP14), which received surface runoff from an adjacent railroad right-of-way, a former electrical transformer pad, and the paved areas east of Building 6 where transformers had reportedly been stored. In addition, the former "pipe shop" was located in the northeast corner of Building 6 and it was suspected that wastes generated from related operations were discharged to soils in this area.
- Slightly elevated concentrations of PAHs and metals were found in soils from the former location of a bilge water disposal area north of Building 42 (monitoring well [MW]05).
- Slightly elevated concentrations of pesticides and leachable metals were detected in soils from the area south of Building 42 (MW07 and TP11), which was a former bulk material storage area.
- Elevated concentrations of phthalate compounds were detected in the soils south of Building 234 (TP07 and TP08), which was an area of suspected chemical discharge described in the PA report.

- High concentrations of semi-volatile organic compounds (SVOCs) and butyltin compounds were detected in the soils under Building 42, apparently due to past discharges from sumps within the building.
- Petroleum-related contaminants were found in soils from the former parking area, east (upgradient) of Huts 1 and 2; however, the contamination appeared to be the result of upgradient releases from former underground storage tanks (USTs) at Building 62. This area was investigated as part of a separate study.
- Low concentrations of petroleum fuel components were detected in the shallow soils north of Building 234. Components were believed to be residual contaminants from former USTs in this area.

Findings of the Risk Evaluation Assessment

A HHRA was performed in 1997 to identify risks to potential receptors at the Site. The current potential receptors evaluated were limited to persons working at the Site on a full-time basis, as well as potential trespassers on the Site. Future receptors evaluated included industrial workers, excavation workers, trespassers, and residents. The primary contributors to calculated risk were arsenic (all areas) and PCBs (from surface soils north of Building 6).

Arsenic is a naturally occurring element in soil and groundwater in Rhode Island, related to the character/mineralogy of the geologic units in the area. A risk-based acceptable (target) level for arsenic in soils has been set by RIDEM, for industrial properties. Many samples of soil at and upgradient of this and other Sites on Aquidneck Island have been found to exceed this target level.

PCBs were found at elevated concentrations in soils north of Building 6. Industrial workers in this area may be exposed to these surface soils, which could cause an increased risk of cancer above the USEPA recommended target level of one in one-hundred thousand for incremental cancer risk.

Recommendations of the Site Assessment Screening Evaluation Report

Recommendations of the SASE included performing limited soil excavations at several areas found to have elevated concentrations of chemical contaminants. These areas were located to the northeast of Building 6, where the risk evaluation showed an increased risk from PCBs present in the soil and the soils under Building 42 which were found to be contaminated with paint residues. Finally, some of the drainage systems under the Building 234 foundation and south of Building 42 were recommended for dismantling or repair, depending on the plans for future use of these specific areas.

2.2 REMOVAL ACTIVITIES

In August 1995, NAVSTA Newport contracted with OHM Corporation (OHM) to conduct a removal action to excavate and dispose of sandblast grit that was known to be present on the ground to the north and east of Building 42. OHM removed this material and covered the exposed ground with a sand and crushed stone mix. As part of this effort, the embankment to the east of Building 42 was excavated and repaired.

Various removal actions were conducted by Foster Wheeler Environmental Corporation (subsequently known as Tetra Tech EC, Inc.) from 1997 through 2007. These actions included the following:

- **Southern Waterfront Berm Removal.** A berm containing construction debris and soil located in the southern waterfront area was removed. Prior to removal, the berm was divided into six equal sections, which were described as Sections 1 through 6. Soils from each section were removed and stockpiled for composite sampling prior to disposal. Samples were analyzed for volatile organic compounds (VOCs), SVOCs, PCBs, metals, and total petroleum hydrocarbons (TPH). Exceedances of RIDEM direct exposure criteria were noted for SVOCs and arsenic. Under an agreement between Navy and RIDEM, stockpiles containing arsenic concentrations above 12 parts per million (ppm) and lead above 150 ppm were disposed off-site. Shoreline restoration activities were conducted after the removals.
- **Building 42 S42-1 Sump Pit Removal.** Surficial soils associated with Sump 1, located beneath former Building 42, were removed to a depth of one foot below ground surface (bgs). Confirmatory samples for VOCs, SVOCs, PCBs, pesticides, metals, and TPH laboratory analyses and reporting were collected following the excavation. Analytical results detected concentrations of arsenic from 15 ppm to 22 ppm which exceeded RIDEM direct exposure criteria (DEC).
- **Test Pit 14 PCB Contaminated Soil Removal.** A series of excavations and confirmatory sampling was conducted to delineate and remove PCB-contaminated soils. Confirmation samples detected the presence of PCBs, lead, arsenic, and TPH above RIDEM DEC. Approximately 430 tons of PCB-contaminated soil was removed from the Test Pit 14 area.
- **Building 42 S42-5 Sump Investigation and Removal.** A concrete sump and associated valve chamber were removed. Approximately 42 tons of concrete debris and associated piping were disposed. At the completion of removal activities, confirmation samples for VOCs, SVOCs, PCBs, metals, and TPH were collected for laboratory analysis and reporting. One location had SVOC and arsenic exceedances of RIDEM DEC.
- **Exploratory Trenching, Former Disposal Pits.** Three exploratory trenches were excavated north of former Building 42 (*i.e.* bilge water disposal area). Based on sample analysis of the soil excavated from the trenches, a hotspot removal was conducted at one location. The hotspot removal action included the removal and disposal of approximately 25 cubic yards of soil.

- **Sandblast Grit Removal.** A series of removal actions were conducted north of Building 6 in the vicinity of a new watchtower to remove subsurface sand blast grit.

3.0 FIELD INVESTIGATIONS

This section describes the field investigation activities implemented as part of the SASE Addendum for the Site. Field tasks, implemented in accordance with the Work Plan Addendum (Tetra Tech, 2011), were conducted by Tetra Tech personnel in February and March of 2011. This section is supported by a series of appendices including:

Appendix A – Field Documentation Forms

Appendix B – Soil Boring and Monitoring Well Construction Logs

Appendix C - Field Modification Records

Appendix D - USEPA low flow standard operation procedures (SOPs)

Appendix E – 2011 Analytical Data Results

Field investigation activities conducted at the Site are summarized in Sections 3.1 through 3.3. The overview of the investigation activities presented below includes; number of samples, locations of samples, types of laboratory analyses, rationale for each location, and field observations and measurements. Samples were collected and analyzed in accordance with the quality assurance/quality control (QA/QC) criteria defined in the Work Plan Addendum (Tetra Tech, 2011).

3.1 SOIL INVESTIGATIONS

Soil samples were collected at the Site to evaluate different target areas and different potential sources of contaminants. This field effort included the advancement of soil borings at several target areas at the Site, as illustrated in Figure 3-1.

Drilling activities were conducted at the Site in order to characterize the overburden geology, to collect surface and subsurface soil samples for laboratory analysis, and for the installation of permanent groundwater monitoring wells. The following subsections provide an overview of the soil boring investigation and summary of the field measurements and observations made during soil boring advancement activities.

3.1.1 Overview of Soil Borings

A total of 17 soil borings were advanced at the Site for the purpose of characterizing soils, and an additional nine soil borings were advanced for the purpose of installing permanent groundwater monitoring wells. The soil boring and permanent monitoring well locations are shown on Figure 3-1.

Boring logs from this effort describing localized soils are presented in Appendix B. A soil boring sample summary is presented on Table 3-1 and a summary of borings and the rationale for each location is provided on Table 3-2.

Soil borings were advanced using direct push technology (DPT), hollow stem auger (HSA) drilling techniques, or hand augers. The soil borings were advanced in accordance with the procedures specified in the approved Work Plan Addendum, except for the following field modifications as documented in field modification records presented in Appendix C.

- Overburden groundwater was not encountered in the original upgradient location of MW223 located in the Naval Underwater Systems Center (NUSC) Fleet Parking area. The bedrock aquifer is considered to be interconnected with the overburden aquifer in the Northern Waterfront; therefore, MW223 was screened in bedrock.
- Monitoring well locations MW221 and MW222 were shifted to the west away from the unnamed road due to traffic safety concerns.
- Monitoring well location MW220 was relocated due to on-going waterfront construction to the south away from the construction zone.
- Soil boring SB218 was renamed SB224 to remove any potential confusion with monitoring well MW218.
- MW11 was a historical permanent monitoring well that was advanced using HSA drilling techniques. During the most recent field event, the monitoring well could not be located and it was determined to be either destroyed or inaccessible. A temporary well point (MW11A) was installed using DPT to collect groundwater and soil gas samples from that location. The original monitoring well (MW11) was screened from 19 to 29 feet (ft.) bgs. The replacement well screen length was adjusted to 5 to 10 ft. bgs due to 1) reaching refusal at shallower depths using the DPT rig, and 2) the need to collect soil gas samples above the water table after a recent heavy rain event.
- Monitoring well location MW219 was shifted to the south away from an armory, utilities, and a septic tank located at the U.S. Marine Corps (USMC) temporary offices.
- Soil gas sample identifiers were renamed to correspond with the co-located monitoring well identifications.
- Existing monitoring well MW02 could not be located. A new monitoring well (MW02A) was installed in the surveyed location of the original well. MW02A was screened at the same depth interval as the original monitoring well.
- In order to conduct a more comprehensive evaluation of the Building 234 sump, the investigation procedure was updated. Instead of advancing a single soil boring (SB203) as prescribed in the Work Plan Addendum, two exploratory borings were advanced with hand augers followed by the

advancement of three additional DPT exploratory borings. This approach provided a more comprehensive coverage and helped to determine if a concrete bottom was present along the entire length of the sump. For the purposes of site boring counts, this location will be considered SB203.

Of the 26 total borings, 13 were advanced using HSA drilling techniques, 9 were advanced using DPT, and 4 were advanced using hand augers. DPT drilling was conducted with a hydraulically-powered direct-push GeoProbe™ drilling rig. Surface and subsurface soil samples were collected using 2-inch diameter Macrocore® samplers with acetate liners. Soil borings were advanced in five foot intervals to the top of bedrock or refusal. HSA drilling was conducted by using a conventional drill rig to advance through subsurface material using a 4.25-inch insider diameter (ID) HSA, and a 2-foot long, 2-inch outside diameter (OD) split-barrel sampler. The split barrel sampler was advanced in 2-foot intervals. Continuous soil samples were collected at select locations, during boring advancement. Hand drilling was conducted by hand turning a stainless steel auger handle until the desired depth was reached. When the target depth was reached the auger was extracted from the borehole and the soil boring was retrieved in roughly 1 ft. intervals.

Once the soil boring was retrieved from the ground the field geologist screened the soil for total VOCs using a photoionization detector (PID). The headspace soil aliquot was collected and the soil description and other observations were recorded on the boring log.

Up to three sample aliquots were collected from each split spoon/sleeve/auger barrel. One aliquot was used for jar headspace screening for total organic vapors, a second aliquot was collected for potential laboratory VOC and/or gasoline range organics (GRO) analysis, and the third aliquot was stored for other possible laboratory analysis.

The physical characteristics of each soil sample were described using the Unified Soil Classification System (USCS) and recorded on boring logs, as displayed in Appendix B. In addition to sample characteristics, other pertinent observations such as depth to water, sample moisture, depth changes in lithology, fill material, staining, and visual contaminants or odors were recorded on the boring logs.

Soil samples were analyzed for a subset of the following analyses dependent on the sample location and the criteria presented in the Work Plan Addendum: VOCs, PAHs, PCBs, metals, and GRO/diesel range organics (DRO). A summary of soil samples collected and selected for laboratory analysis is presented in Table 3-1. General observations such as sample type and number, sampling time, depth interval, and methods are also presented in Table 3-1. Analytical results are discussed in Section 4 of this report.

3.1.2 Field Measurements and Observations during Advancement of Soil Borings

This subsection presents a summary and description of the soil boring program completed by Tetra Tech at the five subareas of the Site. Field documentation collected during implementation of this program is provided in Appendix A (field documentation forms) and Appendix B (soil boring and monitoring well construction logs).

Southern Waterfront Area

Two soil borings, advanced using the HSA drilling technique, were completed in the northern portion of the Southern Waterfront Area, immediately south of former Building 234. Both soil borings (B201 and B202) at this location were advanced to a terminal depth of 18 ft. bgs. One soil sample was collected from each soil boring for laboratory analysis and reporting at the interval below the topsoil layer in order to investigate if any potential PAH or metals contamination is present in the former berm Section 6 of the Southern Waterfront area.

Boring 201: Subsurface soil at B201 included sandy silt with gravel (0 to 2 ft. bgs), poorly graded gravel with silt (2 to 4 ft. bgs), silty gravel (4 to 11.6 ft. bgs), silty sand (11.6 to 13 ft. bgs), poorly graded sand with silt and gravel (13 to 14 ft. bgs), and silty gravel with sand (14 to 18 ft. bgs). Jar headspace screening readings were minimal, peaking at 0.6 ppm on the PID at the 2 to 4 ft. bgs interval at B201. A soil sample for laboratory analysis and reporting was collected from the 2 to 4 ft. depth interval.

Boring 202: Subsurface soil at B202 included sandy silt with gravel (0 to 10.4 ft. bgs), organic silt (10.4 to 12.3 ft. bgs), and sandy silt with gravel (12.3 to 18 ft. bgs). Although headspace readings were not recorded, due to instrument malfunction, the 2 to 4 ft. bgs was selected for laboratory analyses because this interval was grey in color, indicating the presence of native material below the topsoil layer.

Building 234 (Sump 234-4)

At location SB203, two exploratory soil borings were advanced with hand augers followed by the advancement of three additional DPT exploratory borings. These five borings were advanced along the entire length of Sump 234-4 to determine if a concrete bottom was present and to investigate for potential historic TPH contamination associated with the operations in former Building 234. Borings were advanced to a depth of 3 to 5 ft. bgs. Inspection of the boring confid the presence of a concrete bottom in Sump 234-4 therefore no soil samples were collected. Historic records and these field observations

confirmed that the sumps were filled in with clean fill and/or sand. Photographic evidence of material obtained from the DPT borings documented the presence of fill material in Sump 234-4.

Central Shipyard - Building 42 (“hotspot” excavation area and downgradient of sump S42-1)

Two soil borings utilizing the HSA drilling technique were advanced in the Central Shipyard area of the Site to evaluate groundwater quality for potential shallow groundwater contamination associated with two former source areas at this location. Each soil boring at this location was advanced to a terminal depth of 20 ft. bgs. No soil samples were collected from these locations due to the presence of historic soil samples, in accordance with the Work Plan Addendum.

One soil boring (MW218) was advanced north of former Building 42, in the vicinity of TP-25, excavated in 1996 as part of the SASE field investigation. The soil boring was completed as an overburden monitoring well to investigate any potential contamination in the overburden groundwater downgradient of a suspected disposal pit area.

The second soil boring (MW219) was advanced west of former Building 42 and downgradient of former sump S42-1. This soil boring was completed as an overburden monitoring well to investigate any potential contamination in the shallow overburden groundwater from sump discharges from a paint room in former Building 42.

MW218: Subsurface soil at this soil boring location included a thin layer of poorly graded sand with silt and gravel (0 to 0.5 ft. bgs), sandy silt (0.5 to 9.25 ft. bgs), silt with gravelly sand (10 to 11.5 ft. bgs), weathered phyllite (12 to 13.4 ft. bgs), silty gravel (14 to 15.6 ft. bgs), poorly graded sand with silt and gravel (16 to 17.6 ft. bgs) and poorly graded gravel with silt and sand (18 to 19.4 ft. bgs). Jar headspace screening at this soil boring ranged from 0.5 to 1.4 ppm on the PID. This soil boring was completed as monitoring well MW218, screened from 10 to 20 ft. bgs in the overburden to target the interval intersecting the water table.

MW219: Subsurface soil at this soil boring location included a top layer of sandy silt with gravel (0 to 1.8 ft. bgs), poorly graded gravel with silt and sand (2 to 3 ft. bgs), sandy silt (4 to 7.6 ft. bgs), gravelly silt with sand (8 to 9.5 ft. bgs), silty gravel (14 to 16.2 ft. bgs), and gravelly silt with sand (18 to 19.2 ft. bgs). The maximum jar headspace reading was 1.9 ppm on the PID. This soil boring was completed as monitoring well MW219, screened from 10 to 20 ft. bgs in the overburden to target the interval intersecting the water table.

PCB Removal Area - Building 6/Test Pit 14 Area

Seven soil borings (SB208 through SB214) were advanced at this Site subarea using DPT drilling techniques. The seven soil borings were advanced north and east of Building 6 to confirm that previous soil excavations removed PCB-contaminated soils. Due to heavy rain, headspace readings were not recorded during soil boring advancement efforts. Soil borings ranged in total depth from 0.5 to 4 ft. bgs. The soil samples collected from this location were submitted for laboratory analysis and reporting of PAH, PCB, metals, and DRO/GRO.

PCB Removal Area - Building 6/Test Pit 14 Area (Transformer Bank)

Four soil borings (SB215, SB216, SB217, and SB224) were advanced in this area north of Building 6 at the former transformer bank using the hand auger drilling technique. These borings were completed to investigate for potential PCB contamination in the shallow soil (0 – 0.5 ft. bgs) at this area of the Site. The soil samples collected from this location were submitted for PCB laboratory analysis and reporting.

Northern Waterfront - Huts 1 and 2

Four borings were completed in the Northern Waterfront area in the vicinity of former Huts 1 and 2, the location of the former vehicle maintenance area. One soil boring north of former Huts 1 and 2 was advanced using a HSA drill rig to investigate for potential soil and groundwater contamination in the vicinity test pits TP-16 and TP-27, excavated in 1996 as part of the SASE investigation. The soil samples collected from this location were submitted for VOC, PAH, metals, and DRO/GRO analysis and groundwater was submitted for VOC, PAH, and metals analyses.

MW204: Subsurface soil at this soil boring location included a thin asphalt layer (0 to 0.2 ft. bgs), sand and gravel (2 to 16 ft. bgs), and silt, sand, and gravel (16-18 ft. bgs). Jar headspace PID screening readings peaked at 0.5 ppm. The 0 to 2 ft. bgs and 8 to 10 ft. bgs depth intervals were selected for laboratory analysis and reporting. The 8 to 10 ft. depth interval was chosen because this was the interval directly above the water table. MW204 was screened from 8 to 18 ft. bgs in the overburden to best target the interval intersecting the water table.

Three additional soil borings were advanced north/northeast of former Huts 1 and 2 utilizing the HSA drilling technique. These soil borings were advanced to investigate potential soil contamination in the vicinity of TP-16 (1996 sample location). The soil samples collected from these locations were submitted for VOC, PAH, metals, and DRO/GRO laboratory analysis and reporting.

Boring 205: Subsurface soil at this location included silty sand and gravel (0 to 2 ft. bgs), well graded sand and gravel (2 to 4 ft. bgs), poorly graded sand (4 to 8.5 ft. bgs), and silt with sand

and gravel (10 to 14 ft. bgs). Jar headspace PID screening readings peaked at 0.3 ppm. The depth intervals selected for laboratory analysis were from 0 to 2 ft. bgs and 8 to 8.5 ft. bgs. The 8 to 10 ft. interval was chosen because it was inferred to be directly above the water table and consisted of a poorly graded sandy material which would potentially exhibit impacts to environmental media quality from activities associated with the former vehicle maintenance area.

Boring 206: Subsurface material at this boring location included a thin asphalt layer (0 to 0.33 ft. bgs), a thin layer of gravel underneath (0.33 to 0.5 ft. bgs), well graded sand with silt (0.5 to 6 ft. bgs), poorly graded sand with gravel (6 to 12 ft. bgs), poorly graded sand with silt and gravel (12 to 13.5 ft. bgs), and silty sand and gravel (13.5 to 14 ft. bgs). All jar headspace PID screening readings were below 1 ppm. The intervals selected for laboratory analysis were from 0 to 2 ft. bgs and 8 to 10 ft. bgs.

Boring 207: Subsurface soil at this boring location included a thin silty sand and gravel layer (0 to 1.8 ft. bgs), fine sand with trace silt (2.2 to 4 ft. bgs), well graded sand (4 to 10 ft. bgs), well graded sand with gravel (10-12 ft. bgs) and sandy gravel (12 to 13.8 ft. bgs). All PID jar headspace screening readings were below 1 ppm. Sample for laboratory analysis and reporting were selected from the 0 to 2 ft. bgs and 10 to 12 ft. bgs intervals.

Northern Waterfront Area

Six monitoring wells were installed in the Northern Waterfront Area to provide additional groundwater data in areas where VOCs were previously detected in overburden groundwater. Four monitoring wells were located in new portions of the Northern Waterfront area and in one upgradient/background location. Two borings were advanced to replace historic wells MW02 and MW11 that could not be located. In addition, four gas probes were co-located with monitoring wells MW02A, MW03, MW11A, and MW12 for the purposes of collecting samples to evaluate soil gas quality in this area. Groundwater and soil gas samples were submitted for VOC analysis and reporting.

Monitoring wells MW220 and MW221 were installed using the HSA drilling technique downgradient of the former hazardous waste storage area.

MW220: Subsurface soil encountered at this location included gravelly silt with sand (0 to 2 ft. bgs), well graded sand with gravel (2 to 4 ft. bgs), poorly graded sand (4 to 10 ft. bgs), poorly graded sand with gravel (10 to 14 ft. bgs), well graded sand with gravel (14 to 17.6 ft. bgs), silt (17.6 to 18.6 ft. bgs), and poorly graded sand (18.6 to 20 ft. bgs). All jar headspace PID

screening readings were below 1 ppm. MW220 was screened from 5 to 20 ft. bgs in the overburden to target the interval intersecting the water table.

MW221: Subsurface material encountered at this location included a thin layer of asphalt pavement (0 to 0.33 ft. bgs), silty sand with gravel (0.33 to 4 ft. bgs), poorly graded sand with gravel (4 to 5 ft. bgs), poorly graded sand (6 to 7 ft. bgs), and silty sand and gravel (8 to 15.3 ft. bgs). All PID jar headspace screening readings were below 1 ppm. MW221 was screened from 3 to 15 ft. bgs in the overburden material to target the interval intersecting the water table.

MW222: Monitoring well MW222 was installed in the central portion of the northern waterfront area. Subsurface soil encountered at this location included well graded sand with silt and gravel (0 to 1.5 ft. bgs), well graded sand with gravel (2 to 5.5 ft. bgs), poorly graded sand (6 to 14 ft. bgs), silt with gravelly/sandy matrix (14 to 24.9 ft. bgs). The maximum jar headspace PID screening result was documented at 3.7 ppm at the 0 to 2 ft. bgs. MW222 was screened from 4 to 14 ft. bgs in the overburden to target the interval intersecting the water table.

MW02A: Monitoring well MW02A was installed to the original well which could not be located. Subsurface material encountered at this location included a thin asphalt layer (0 to 0.5 ft. bgs), silty gravel with sand (0.5 to 1.0 ft. bgs), silty sand (1.0 to 25.6 ft. bgs), and poorly graded gravel with silt and sand (25.6 to 26 ft. bgs). Because this was a replacement well, headspace readings were not recorded. MW02A was screened from 16 to 26 ft. bgs to mimic the screen location of the original monitoring well (MW02). A soil gas probe was also installed at this location.

MW11A: Monitoring well MW11A was installed at the northern waterfront area south of pier 2 (location of a historic monitoring well) using the DPT drilling technique. This soil boring was completed as a temporary monitoring well (MW11A) because the original monitoring well (MW11) could not be located. In addition, the location is an active construction area where a permanent monitoring well would have likely been destroyed. The original well was installed using the HSA drilling technique and screened from 19 to 29 ft. bgs. This replacement well was screened from 5 to 10 ft. bgs due to depth limitations using the DPT rig and the need to collect soil gas samples above the higher water table.

MW223: Monitoring well MW223 was installed in an upgradient/background location at the former fleet parking area. This well was completed as a bedrock well because groundwater was not encountered in the overburden. Subsurface soil encountered at this location included gravelly sand (0 to 2 ft. bgs), silty gravel (2-4 ft. bgs), well graded sand with silt and gravel (4 to 4.3 ft.

bgs.), silt with gravel (4.3 to 6 ft. bgs), sandy silt with gravel (6 to 25.8 ft. bgs), shale or weathered phyllite (25.8 to 28 ft. bgs), and bedrock (28 to 47 ft. bgs). Jar headspace readings were not recorded because no soil samples were collected from this location. MW223 was screened from 41 to 51 ft. bgs in bedrock to target the interval intersecting the bedrock water table.

3.2 GROUNDWATER SAMPLING

Groundwater sampling was conducted to identify contaminants present, if any, their impacts on groundwater quality, and to provide information on the groundwater elevations and flow dynamics across the Site. This subsection provides an overview of the groundwater sampling efforts, including summaries of the monitoring well installation methods, well construction details, groundwater sampling methodology, and field measurements and observations associated with the groundwater investigation conducted at the Site. Locations of groundwater monitoring wells are presented on Figure 3-1. Soil boring logs, well boring logs, and groundwater monitoring well construction logs are presented in Appendix B. A detailed evaluation of groundwater sample analytical data is presented in Section 4.0.

Nine additional monitoring wells and three existing monitoring wells were sampled across the Site as part of the SASE Addendum field efforts completed by Tetra Tech. Monitoring well locations were chosen to further investigate areas of suspected groundwater quality impacts based upon historical information. As previously described in Section 3.1.2, one monitoring well was screened in bedrock, while the remaining monitoring wells were screened across the overburden water table interface. At each monitoring well location, a boring was advanced down to refusal, or to a targeted depth (i.e. locations MW11A and MW02A). Soil samples were only collected at one location (MW204), in accordance with the Work Plan Addendum.

The monitoring wells were constructed of 2-inch ID, flush-threaded, Schedule 40 polyvinyl chloride (PVC) screen and riser. 10-slot (0.010 in) well screens were installed in lengths ranging from 5 to 15 ft. The well annulus was backfilled with No.1 silica (quartz) sand filter-pack to at least 1 ft. above the top of the well screen, and a minimum 2 ft. thick seal consisting of bentonite chips was placed above the sand pack. Cement/bentonite grout was placed in the well annulus from the top of the bentonite seal to the ground surface. A concrete surface seal was placed at each well surrounding the casing, excluding monitoring well MW-11A (temporary well). Table 3-3 presents a summary of monitoring wells that were installed and provides details on the construction of the wells installed as a part of this SASE Addendum.

3.2.1 Monitoring Well Installation

A total of nine monitoring wells (eight overburden and one bedrock) were installed during the February-March 2011 field event. One of the eight overburden monitoring wells (MW11A) was completed as a temporary well using DPT drilling techniques and the remaining seven overburden wells (MW02A, MW218, MW219, MW204, MW220, MW221, and MW222) were completed as permanent wells installed using HSA drilling methods. With the exception of MW02A, the well depths, screen placement, and screen lengths of the permanent overburden wells were chosen based upon jar headspace PID screening and field observations obtained from split-spoon soil sampling. The well depth, screen placement, and screen length for replacement well MW02A was identical to that of the well being replaced (MW02).

The one bedrock monitoring well (MW223) was completed as a permanent well using the HSA drilling methods. This well served to provide upgradient data for the Northern Waterfront monitoring wells. The bedrock monitoring well screen was set at 41 to 51 ft. bgs.

3.2.2 Groundwater Monitoring Well Development and Water Level Measurements

Nine new and three existing monitoring wells were developed during the February-March 2011 sampling event. For newly installed monitoring wells, development was conducted no sooner than three days after well installation. Each well was developed by removing water with 1/2-in ID, 5/8-in OD low density polyethylene (LDPE) tubing fitted with a check valve and driven by a Waterra pump. During well development, water quality parameters (stabilization criteria) were monitored, including: pH, conductivity, temperature, and turbidity. The objective of the well development program was to establish connectivity with the aquifer by removing fine-grained sediments from the soil formation within the vicinity of the well screen, pumping until the water quality parameters stabilized, optimally achieving a turbidity of less than 10 Nephelometric Turbidity Units (NTUs).

None of the monitoring wells achieved these optimum stabilization criteria because the silty nature of the soil in the area created high turbidity conditions in the wells. Final turbidity levels in one monitoring well (MW-218 at 12.3 NTUs) approached the 10 NTU criteria, but the remaining wells were well above the turbidity stabilization goal (85.1 to 1456 NTUs). Turbidity readings for two of the eleven monitoring wells (MW-204 and MW-222) were either not measured or measured inconsistently due to an equipment malfunction. A summary of the well development data, including the final stabilization criteria readings, is provided in Table 3-4. Well development logs are provided as part of the field documentation forms in Appendix A.

During groundwater sampling efforts, depths to groundwater (recorded as static water levels on the low flow log sheet) ranged from approximately 5.09 (MW222) to 14.91 (MW218) ft. below top of the PVC riser pipes across the site. The depth to water in temporary monitoring well MW11A (6.11 ft. bgs) was measured from the ground surface. The top of the water column was gauged in each monitoring well with an oil-water interface probe to check for the potential presence of light non-aqueous phase liquids (LNAPLs). LNAPL was not detected in any of the monitoring wells gauged during this investigation.

Survey activities to document elevation and horizontal location data for each of the newly installed groundwater monitoring wells, soil borings, and soil gas sample collection points were conducted on April 2011. The horizontal control datum was North American Datum (NAD) 1983 and the vertical control datum was National Geodetic Vertical Datum (NGVD) 1929. The elevations of each well's outer protective casing and the top of the PVC inner riser pipe were surveyed to the nearest one-hundredth of a foot (0.01 ft.). The ground adjacent to each well and the soil boring locations were surveyed to the nearest one-tenth of a foot (0.1 ft.). The well coordinates and elevations are provided in Table 3-3.

3.2.3 Groundwater Sample Collection

Groundwater sampling was conducted from February 24, 2011 through March 17, 2011. Groundwater samples for laboratory analysis were collected from nine newly-installed monitoring wells and from three existing monitoring wells. All monitoring wells were sampled using low stress (low-flow) purging and sampling procedures according to the GW-001 USEPA Region I low-flow SOP, as presented in Appendix D.

Dedicated tubing was used in each monitoring well to minimize potential cross-contamination between monitoring wells during well purging efforts. Water level, drawdown, and flow rate were recorded on low-flow groundwater sample log sheets. Groundwater was pumped through a flow-through cell which allowed measurements of pH, specific conductance, temperature, dissolved oxygen (DO) oxidation-reduction potential (ORP), and salinity. Turbidity was measured separately with a nephelometer. These field indicator parameters were all recorded on low-flow groundwater sample log sheets, provided as part of the field documentation forms in Appendix A. No PID positive detections, odors, or sheens were noted during the purging and sampling event, or during previous well development activities.

Approximately six to thirty-three liters of groundwater were purged from each monitoring well prior to stabilization of sampling criteria, as documented in Table 3-5. Final turbidity values of less than 5 NTUs were recorded in 6 of the 12 monitoring wells sampled. Final turbidity values in the remaining wells

ranged from 7.36 NTUs (MW11A) to 50 NTUs (MW223). Drawdown levels during the final three readings (stabilization time) did not exceed 0.3 ft. in any of the monitoring wells.

Groundwater samples collected from all monitoring wells were analyzed for VOCs, and samples collected from selected monitoring wells (MW08, MW204, MW218, and MW219) were also analyzed for PAHs and for total and dissolved Target Analyte List (TAL) metals. The associated field forms are presented in Appendix A.

3.3 SOIL-GAS SAMPLE COLLECTION

Soil-gas sampling was conducted on February 24 and March 3, 2011. Soil-gas samples were collected from four locations (co-located with monitoring wells) as depicted on Figure 3-1.

Prior to sampling, vapor probes were advanced using a DPT rig. After installation, the vapor probes were sealed from the atmosphere using modeling clay and then leak tested to verify the seal integrity. Using a vacuum pump calibrated to a flow rate of 200 milliliters per minute (ml/min), three probe volumes (volume of the soil vapor sampling probe and attached tubing) of soil gas was purged into a 3 liter (L) polyethylene (PE) bag. A PID was used to screen the collected soil vapor for total VOCs and a helium detector was again used to evaluate the bag seal. Following a successful leak test, a 1 hour purge was allowed before attaching and filling a clean 6 L Summa canister for submittal to the laboratory for analysis and reporting.

Prior to moving to a new sample location, the probe rods were removed from the subsurface and scrubbed with a detergent solution before being rinsed with potable and then distilled water. Dedicated tubing was used at each soil gas sampling station to minimize the potential for cross-contamination. All field measurements and notable observations made during soil gas sampling were recorded on sample log sheets, provided as part of the field documentation forms in Appendix A. A summary of the field measurements collected during soil gas sampling program is provided in Table 3-6.

Four soil-gas (SG) samples (SG-MW02A, SG-MW03, SG-MW11A, and SG-MW12) were collected and submitted for VOC laboratory analysis via USEPA Method TO-15. All samples were collected below a depth greater than 5 ft. bgs (deep SG), except SG-MW11A which was collected from 2 to 3 ft. bgs, a shallow SG interval.

Soil profile observations were recorded during the installation of MW02, MW03, MW11, and MW12 in 1996. The uppermost surficial materials in the Northern Waterfront area were described primarily as gravelly sands, silty sands, and fine to medium poorly graded sands with varying proportions of silt,

gravel, and traces of shell fragments in some soils. These sands continue at the deepest borings to approximate depths between 10 ft. bgs at (MW03) to 24 ft. bgs (at MW02), and are underlain by a tight and dense, silty, gravelly, sand with trace clay (probable till). The probable till, encountered above weathered bedrock, varied between approximately 8 ft thick at MW03 to approximately 12 ft thick at MW04.

During the advancement of vapor probes at location SG-02A, the encountered material included a thin asphalt layer (0 to 0.5 ft. bgs), silty gravel with sand (0.5 to 1.0 ft. bgs), silty sand (1.0 to 25.6 ft. bgs), and poorly graded gravel with silt and sand (25.6 to 26 ft. bgs).

4.0 ANALYTICAL RESULTS

This section presents a discussion of the analytical results from environmental media samples that were collected and analyzed in 2011 as part of this SASE Addendum investigation. Analytical results for contaminants present at concentrations greater than the laboratory instruments detection limits are summarized in Tables 4-1 through 4-4. The complete analytical results can be found in Appendix E.

4.1 SAMPLE ANALYSIS AND DATA VALIDATION

Soil, groundwater, and soil gas samples were collected and analyzed in accordance with the SASE Work Plan Addendum (Tetra Tech, 2011). Laboratory analysis was conducted under USEPA SW-846 for VOCs was by Method 8260B, PAHs by Method 8270C, PCBs by Method 8082, DRO and GRO by Method 8015B, and metals by Methods 6010C, 7470A and 7471A. Soil-gas samples were analyzed for VOCs by USEPA TO-15 Air Compendium Method.

Petroleum hydrocarbons (extractable) were analyzed using a gas chromatography/flame ionization detector (GC/FID) method (USEPA Method 8015B) modified for quantification of extractable petroleum hydrocarbons in the C-8 to C-40 range. Results from this analysis were reported as DRO. In addition, GRO analysis provided quantification of petroleum hydrocarbons in the C-6 to C-10 range. Both DRO and GRO results are discussed in the text of this section as petroleum hydrocarbons.

All the laboratory data results were validated by Tetra Tech chemists according to established USEPA Region I data validation guidelines. A Tier II level data validation was performed for the VOC, SVOC, PAH, pesticide, PCB, GRO, DRO, and metals results.

In general, data were found to be acceptable for use in this SASE and for evaluation of risk under Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and USEPA protocols. Qualifications on the reported data are documented in the data validation memoranda for each data package provided by the analytical laboratory. Data validation memoranda are presented in Appendix E of this report.

The discussion in this section contains summaries of analytical results along with comparisons of detected contaminant levels to comparison criteria as described in Section 4.1.1 of the On-Shore Deregulation Shipyard Work Plan Addendum (Tetra Tech, 2011).

4.2 SUMMARY OF ANALYTICAL RESULTS

Data discussions in this section focus on the maximum concentrations of chemical contamination detected. Concentrations of chemical contamination are presented in summary Tables 4-1 through 4-4, for each environmental media that was sampled.

Analytical results for field duplicate samples were averaged with the original sample results. Sample stations where this calculation was performed are identified with the suffix "-AVG". For instances where two positive or non-detected results were reported, the results were added together and divided by two. For instances where one positive result and one non-detect result were reported, the positive result was added to one-half the undetected result and then divided by two. If the non-detect result was elevated due to dilutions, the positive result was used for the average.

Contaminant-specific concentrations were compared to project action levels (PALs) established in the Work Plan Addendum. PALs for soil consisted of the lowest of the USEPA Regional Screening Levels (RSLs) (2011) and the RIDEM Residential Soil DEC. PALs for groundwater consisted of the lowest of USEPA maximum contaminant levels (MCL) and the RIDEM GA groundwater aquifer criteria. PALs for soil gas were derived from USEPA residential air RSLs adjusted by an attenuation factor of 0.01 for deep soil gas samples. In addition, RSLs adjusted by an attenuation factor of 0.1 for shallow soil gas were presented for comparison purposes.

The NAVSTA Newport Basewide Background Study (Tetra Tech, 2008) was used to establish background concentrations for inorganics. The ProUCL software program was used to calculate the 95% Upper Predictive Limit (UPL) to be used as a background threshold value (BTv) for Site 19 – On-Shore Derecktor Shipyard. 95% UPLs were calculated from the base background dataset for all surface and subsurface soil types. The soil types were combined because the soil type at the Site is classified as urban fill and is likely a combination of different soil types from other portions of NAVSTA Newport. The background analysis is included in Appendix G-1.

4.2.1 Southern Waterfront Area

Subsurface Soil

Two borings, SB201 and SB202, were advanced in former berm Section 6 of the Southern Waterfront area to a depth of 2 to 4 ft bgs. Subsurface soil samples were collected from below the topsoil layer and analyzed for PAHs and metals to confirm no residual contamination is present. Analytical results indicated no PAHs present above the laboratory instruments method detection limits. The following metals were detected above USEPA RSLs in both samples: aluminum, arsenic, chromium, cobalt, iron,

and manganese. All concentrations were above the 95% UPL background concentrations, except for chromium in SB202, and manganese in both samples. Beryllium was also detected above the Rhode Island (RI) Residential DEC in SB201, but not above the 95% UPL background concentration. Chemicals of concern (COCs) in the stockpiles created during the removal actions conducted at the southern waterfront included PAHs, arsenic, and lead. In the 2011 samples, lead was detected at a maximum of 13.6 J milligrams per kilogram (mg/kg) in SB202 and arsenic at a maximum of 26.3 mg/kg in SB202. Concentrations of select PAHs and metals are presented in Figure 4-1. Table 4-1 presents a summary of the results for analytes that were present at levels greater than detection limits. Complete analytical results can be found in Appendix E.

4.2.2 Building 234 Area

Sump 234-4 Exploratory Boring - Subsurface Soil

Exploratory borings were advanced to confirm the presence of a concrete bottom in Sump 234-4. Two hand auger borings indicated that an intact concrete bottom was present in the vicinity of the boring. In an effort to further delineate the extent of the concrete flooring three additional DPT borings were advanced to confirm the presence of a concrete bottom. No samples were submitted for laboratory analysis at this location since each exploratory boring confirmed the presence of fill material and a concrete bottom.

MW-08 - Groundwater

North of former Building 234 an existing overburden monitoring well (MW08) was sampled to investigate any potential impacts to groundwater quality from the former location of USTs and a machine shop to the shallow overburden aquifer. One overburden groundwater sample was collected from MW08 and analyzed for VOCs, PAHs, and metals (total and dissolved).

Five chlorinated VOCs (1,1-dichloroethene, cis-1,2-dichloroethene, TCE, trichlorofluoromethane, and vinyl chloride) were detected during the March 2011 groundwater sample round at concentrations below groundwater PALs, as illustrated in Figure 4-2. No PAHs were detected above the laboratory's instrument method detection limits. A total of 14 metals were detected in MW08 total and dissolved sample fractions at concentrations below criteria. Table 4-2 presents a summary of the results for analytes that were present at levels greater than detection limits in groundwater samples.

4.2.3 Central Shipyard - Building 42 ("Hotspot" Excavation Area and Downgradient of Sump S42-1)

Monitoring Wells MW-218 and MW-219

Shallow overburden groundwater at MW-218, was collected to investigate potential contamination associated with a past TPH source investigation. Former location TP-25 associated with the source investigation had elevated FID readings and an observable sheen at the water table. The groundwater samples collected during the February - March 2011 sample round were analyzed for VOC, PAHs, and metals. No VOCs or PAHs were observed above the laboratory instruments method detection limits in groundwater. Both total and dissolved arsenic were present at concentrations 2.8 and 2.9 times greater than the MCL, respectively. Table 4-2 presents a summary of the results for analytes that were present at levels greater than the laboratory instruments method detection limits in groundwater samples.

MW-219 was installed to investigate potential overburden groundwater contamination downgradient of former paint/solvent sump S42-1. Groundwater samples were collected for VOCs, PAHs, and metals. Acetone was the only VOC detected in the groundwater sample. It was present in the duplicate sample but was not found above the laboratory instruments method detection limits in the original sample. No PAHS were detected above the laboratory instruments method detection limits. A total of 14 total metals and 13 dissolved metals were detected in groundwater. Concentrations of total and dissolved arsenic were detected at levels more than 7 times greater than the MCL (10 micrograms per liter [µg/L]). There were no other exceedences of metals criteria in groundwater. Figure 4-2 presents concentrations of selected analytes (VOCs and arsenic) for this location.

4.2.4 PCB Removal Area - Building 6/Test Pit 14/Area

Surface Soil

Surface soil samples were collected from two borings, SB208 and SB209, advanced in the vicinity of the Building 6/TP-14 PCB removal area and submitted for DRO/GRO, PAHs, PCBs, and metals analyses.

DRO was detected below the RIDEM DEC with concentrations ranging from 35.5 mg/kg (SB208-D) to 366 mg/kg (SB209). GRO was also detected below RIDEM DEC in SB208 (2.83 mg/kg) and its duplicate sample SB208-D (4.82 J mg/kg).

Aroclor 1260 was detected with concentrations ranging from 24.2 J micrograms per kilogram (µg/kg) (SB208-D) to 416 J µg/kg (SB209). The concentration detected in SB209 exceeded the USEPA criteria of 220 µg/kg.

Seventeen PAHs were detected, with eight PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) exceeding criteria. Three exceedances of PAH criteria were detected in SB208, one exceedance of benzo(a)pyrene criteria was in SB208-D, and eight exceedances of PAH criteria were in SB209.

Twenty metals were detected in surface soil, with seven (aluminum, arsenic, beryllium, chromium, cobalt, iron, and manganese) exceeding USEPA RSL criteria. The maximum concentrations of the seven exceedances occurred in either SB208 or its duplicate. Background concentrations were not exceeded for aluminum, arsenic, beryllium, chromium, cobalt, iron, and manganese in SB209; and chromium in both locations. Soil concentrations of selected PAHs, PCB, and metals (arsenic and chromium) are presented in Figure 4-3.

Subsurface Soil

Five subsurface soil samples, SB210 through SB214, were collected for laboratory analyses and reporting of DRO/GRO, PAHs, PCBs, and metals in the vicinity of the Building 6/TP-14 PCB removal area.

DRO was detected below criteria with concentrations ranging from 17.8 mg/kg (SB212) to 48.2 mg/kg (SB211). GRO was not present above the laboratory instrument method detection limits. PCBs were not detected above the laboratory instrument method detection limits in any sample.

Seventeen PAHs were detected in subsurface soil, with four PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene) exceeding criteria. Exceedances of each of the four PAH criteria were detected in SB214, while the only exceedance recorded in the remaining three locations was for benzo(a)pyrene.

Twenty-one metals were detected in subsurface soil, with five of those metals (arsenic, beryllium, chromium, iron, and manganese) exceeding criteria in all five samples. Aluminum and cobalt exceeded their respective standards in four samples. Background concentrations were exceeded for arsenic, chromium, and manganese in SB214; and beryllium in SB212 and SB214. Soil concentrations of selected PAHs, PCBs, and metals are presented in Figure 4-3.

4.2.5 PCB Removal Area - Building 6/Test Pit 14/Area (Transformer Bank)

Surface Soil

Four soil borings (SB215, SB216, SB217, and SB224) were advanced in the vicinity of the transformer bank located in the Building 6/TP-14 PCB removal area. Surface soil samples collected from the borings

were analyzed for PCBs. Analytical results indicated that no PCBs were present above the laboratory instruments method detection levels.

4.2.6 Northern Waterfront - Huts 1 and 2

Four borings, SB204 through SB207 were advanced in the vicinity of Huts 1 and 2 to investigate potential releases associated with a former vehicle maintenance area. Surface and subsurface soil samples were collected and analyzed for VOCs, DRO/GRO, PAHs, and TAL metals. Boring SB204 was completed as monitoring well MW204. The groundwater sample collected from this location was analyzed for VOCs, PAHs, and TAL metals (total and dissolved).

Surface Soil

The following VOCs were detected in surface soil: 2-butanone, 2-hexanone, acetone, and carbon disulfide. Acetone was detected in four of the five samples in which it was analyzed, while the remaining VOCs were only detected once in surface soil. Each of the four VOCs detected in surface soil were below criteria.

DRO was detected in three of the five samples collected with concentrations ranging from 12.8 mg/kg (SB204-D) to 31.6 mg/kg (SB207). Detected DRO concentrations were at least an order of magnitude less than the soil DEC. No GRO was detected above the laboratory instruments method detection limits in the surface soil.

Seventeen PAHs were detected in surface soil, with four PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene) exceeding RSLs. Exceedances of PAH criteria were recorded in only two of the four samples (SB205 and SB207). Four PAHs were detected above criteria in SB205 (benzo(a)anthracene [232 J µg/kg], benzo(a)pyrene [165 µg/kg], benzo(b)fluoranthene [263 µg/kg], and dibenzo(a,h)anthracene [124 µg/kg]) and only one PAH was detected above criteria in SB207 (benzo(a)pyrene 29.6 j µg/kg). No PAHs were detected in SB204-D.

Nineteen metals were detected in surface soil, with seven of those metals (aluminum, arsenic, beryllium, chromium, cobalt, iron, and manganese) exceeding criteria. Arsenic, chromium, cobalt, and iron, exceeded their respective criteria in each of the sample locations. Beryllium exceeded criteria in two sample locations (SB205 and SB207), and aluminum and manganese exceeded criteria in one location (SB205). Background concentrations were only exceeded for beryllium, cobalt, and iron in SB205. Concentrations of selected PAHs and metals are presented in Figure 4-1.

Subsurface Soil

Two VOCs, carbon disulfide and m+p xylenes were detected once in SB204 (2.8 J µg/kg) and SB205 (2.6 J µg/kg), respectively. The concentration of carbon disulfide was more than four orders of magnitude less than the regulatory criteria. There was no applicable standard for comparison to m+p xylene.

DRO was detected in one of the four subsurface soil sample collected (SB204 at 7.49 mg/kg) at a concentration two orders of magnitude less than the RIDEM DEC. No GRO was detected above the laboratory instruments method detection limits in the subsurface soil.

Sixteen PAHs were detected in subsurface soil, with two PAHs (benzo(a)pyrene at 23.3 µg/kg and dibenzo(a,h)anthracene at 23.3 µg/kg) exceeding criteria in sample SB205. Both exceedances were recorded in SB205. PAHs were not detected in SB204 or SB206.

Eighteen metals were detected in subsurface soil, with four metals (arsenic, chromium, cobalt, and iron) exceeding criteria. Maximum concentrations of arsenic (9.78 mg/kg), cobalt (5.85 mg/kg), and iron (20,900 mg/kg) were found in SB207. The maximum concentration of chromium was found in SB205 (9.49 mg/kg). None of the detected concentrations exceeded background concentrations. Concentrations of selected PAHs and metals are presented in Figure 4-1.

Groundwater

Analytical results indicated the presence of one VOC, TCE (3.16 µg/l) in groundwater monitoring well MW204. There were no exceedances of VOC USEPA MCL criteria in groundwater. There were no PAHs present above detection limits. A total of 11 total and dissolved metals were detected in groundwater with no exceedances of criteria. Concentrations of select VOCs are presented in Figure 4-2.

4.2.7 Northern Waterfront

Groundwater

Eight groundwater monitoring wells were sampled for VOCs in the Northern Waterfront Area. One monitoring well (MW02A) was installed west of former oil discharge area to investigate potential groundwater contamination in the vicinity of areas of former oil discharges. Three monitoring wells (MW03, MW220, and MW221) were installed to investigate impacts of the hazardous waste storage area to groundwater quality in the area. Two additional monitoring wells (MW11 and MW12) were sampled to assess impacts of former storage areas and other disposal on deep overburden groundwater. One monitoring well (MW222) was sampled to investigate potential groundwater contamination in the center of the northern waterfront area, and one monitoring well (MW223) was installed to provide an upgradient groundwater data point. One duplicate sample (MW11A-D) was collected from MW11.

Five chlorinated VOCs (cis-1,2-dichloroethene, tetrachloroethene, trans-1,2-dichloroethene, TCE, and vinyl chloride) were detected in northern waterfront groundwater samples above the laboratory instruments method detection limits during the February/March 2011 groundwater sample round. TCE was the only VOC to exceed the PAL (5 µg/L). TCE exceeded criteria in five of the 8 monitoring wells in which it was sampled with concentrations ranging from 4.97 µg/L (MW11A-D) to 12.2 µg/L (MW221).

At least one VOC was present above detection limits in each of the northern waterfront area wells, with the exception of MW223, the northern waterfront area background well. Concentrations of select VOCs are presented in Figure 4-5. Table 4-3 presents a summary of the results for analytes that were present at levels greater than detection limits in groundwater samples. A full list of results for all parameters that were analyzed for can be found in Appendix C.

Soil Gas

Three deep soil gas stations (SG-MW02A, SG-MW03, and SG-MW12) and one shallow soil gas station (SG-MW11A) were sampled in the Northern Waterfront Area during the February/March 2011 soil gas sample round. Soil gas sample stations were collocated with the following northern waterfront area monitoring wells: MW2A, MW03, MW11A, and MW12. One duplicate sample (SG-MW03-D) was collected from SG-MW03. Soil gas samples were analyzed for VOCs as described in Section 3.3.

Thirty-three VOCs were detected in the Northern Waterfront Area. At the deep soil gas stations, no VOCs were detected above USEPA deep soil gas criteria adjusted by the 0.01 attenuation factor. At the shallow soil gas station, SG-MW11A, five VOCs (1,3-butadiene, acrylonitrile, benzene, tetrachloroethene, and TCE) were present above shallow soil gas criteria adjusted by the 0.1 attenuation factor. Select concentrations of VOCs are presented in Figure 4-6. Table 4-4 presents a summary of the results for analytes that were present at levels greater than detection limits in soil gas samples. A full list of results for all parameters that were analyzed for can be found in Appendix C.

5.0 HUMAN HEALTH RISK ASSESSMENT

This section presents the HHRA for the Site and is an update of the HHRA presented in the SASE Report (B&RE, June 1997). The HHRA was updated to incorporate changes in the risk assessment methodology since the original HHRA was prepared and to include additional data that has been collected at the Site since that time. The objective of the HHRA is to determine whether exposure to chemicals in the study area pose a potential unacceptable risk to potential human receptors. The potential risks to human receptors are estimated based on the assumption that no actions are taken to control contaminant releases.

The following current guidance and reports published by the Navy, the USEPA, and the State of Rhode Island were considered in the preparation of this document:

- Conducting Human Health Risk Assessments under the Environmental Restoration Program (Navy, February 2001).
- Navy Policy on the Use of Background Chemical Levels (Navy, January 2004).
- U.S. Navy Human Health Risk Assessment Guidance (Navy, December 2008)
- Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (RIDEM, 2011).
- Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part A) (USEPA, December 1989).
- Soil Screening Guidance: Technical Background Document (USEPA, May 1996).
- Exposure Factors Handbook (USEPA, August 1997).
- Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (USEPA, December 2002).
- Guidance for Characterizing Background and Chemical Concentrations in Soil for CERCLA Sites (USEPA, December 2002).
- Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) (USEPA, July 2004).
- Guidelines for Carcinogen Risk Assessment (USEPA, March 2005).
- Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, March 2005).
- Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment) (USEPA, January 2009).

The HHRA is structured and reported according to the guidelines of the Risk Assessment Guidance for Superfund (RAGS), Human Health Evaluation Manual, Part D: Standardized Planning, Reporting, and Review of Superfund Risk Assessments (RAGS Part D) (USEPA, December 2001). The assessment follows the methodology used for the HHRAs for Site 8 (Tetra Tech, January 2010) and Tank Farm 4 and 5 (Tetra Tech, January 2011).

This HHRA consists of five components: data evaluation, exposure assessment, toxicity assessment, risk characterization, and uncertainty analysis. Sections 5.1 through 5.6 contain detailed discussions of the six components of the HHRA.

Three major aspects of chemical contamination and environmental fate and transport must be considered to evaluate potential risks: (1) contaminants with toxic characteristics must be found in environmental media and must be released by either natural processes or by human action; (2) potential exposure points must exist; and (3) human receptors must be present at the point of exposure. Risk is a function of both toxicity and exposure. If any one of these factors is absent for a site, the exposure pathway is incomplete, and no potential risks are considered to exist for human receptors.

5.1 DATA EVALUATION

Data evaluation, the first component of a baseline HHRA, is a medium-specific task involving the compilation and evaluation of analytical data. The second step (and the main objective) of the data evaluation is to develop a medium-specific list of chemicals of potential concern (COPCs) that will be used to quantitatively and/or qualitatively determine potential human health risks for site media. COPCs are selected primarily based on a risk-based screen (i.e., a comparison of site contaminant concentrations to conservative risk-based screening values) and a background screen (i.e., a comparison of site concentrations to background concentrations).

5.1.1 Data Usability

Soil and groundwater samples from the SASE Report (B&RE, January 1997) and soil, groundwater, and soil gas samples from the 2011 field investigation were used in this HHRA. As discussed in Section 2, several non-time critical removal actions (NTCRA) were completed from 1997 to 2007 at the Site. Samples located in the areas where the removal actions occurred have been removed from the database and were not used in this HHRA. Both the historical samples and 2011 samples were used to select COPCs. Surface soil samples at the Site include those from the 0 to 1 ft. bgs, 0.5 to 1.5 ft. bgs, and 0 to 2 ft. bgs.

Only the 2011 groundwater samples were used to quantify risks to groundwater, since this data is representative of the current conditions at the Site. Both total (unfiltered) and dissolved (filtered) groundwater sampling results are presented in the COPC selection tables although only the total results were used to quantify risks.

Field measurements and data regarded as unreliable (e.g., qualified as "R" during the data validation process) were not used in the quantitative HHRA. The maximum of the original and duplicate sample was used in the selection of COPCs. Samples used in this HHRA are listed on the COPC selection tables and in Appendix F.1.

5.1.2 Selection of Chemicals of Potential Concern

The selection of COPCs is a quantitative screening process used to limit the number of chemicals and exposure routes quantitatively evaluated in the baseline HHRA to those site-related constituents that dominate overall potential risks. Screening by risk-based concentration (RBC) is used to focus the risk assessment on meaningful chemicals and exposure routes.

In general, a chemical is selected as a COPC and retained for further quantitative risk evaluation if the maximum detection in a sampled medium exceeds the lowest RBC and for inorganics is present above background levels. Chemicals eliminated from further evaluation are assumed to present minimal risks to potential human receptors. Medium-specific tables summarizing the selection of COPCs are included in the risk assessment.

5.1.2.1 Derivation of Screening Criteria

The primary criteria used to identify COPCs are based on USEPA RSLs (May 2012) and criteria established by the RIDEM, Office of Waste Management (November 2011) as discussed in the Work Plan Addendum 1 (February, 2011). The RIDEM criteria are being used in this HHRA because they were used in the previous HHRA (B&RE, June 1997). The RSLs were developed and are maintained through a cooperative agreement between Oak Ridge National Laboratory (ORNL) and USEPA's Office of Superfund, and are considered to be USEPA screening criteria. The RSLs are based on exposure pathways for which generally accepted methods, models, and assumptions have been developed (i.e., ingestion, dermal contact, and inhalation) for specific land-use conditions and do not consider impact to groundwater or ecological receptors. The screening concentrations based on the RSLs correspond to a systemic hazard quotient (HQ) of 0.1 for non-carcinogens or an incremental lifetime cancer risk (ILCR) of 1×10^{-6} for carcinogens. The RSLs for non-carcinogens are based on an HQ of 1, whereas the screening

concentrations used in the selection of COPCs were based on an HQ of 0.1 to account for the potential cumulative effects of several chemicals affecting the same target organ or producing the same adverse non-carcinogenic effect. The RIDEM criteria include residential direct contact exposure criteria, leachability criteria (classification GA), and GA groundwater objectives.

The COPC screening levels used for each medium in the risk assessment are discussed below.

Screening Levels for Soil

Screening levels based on the following criteria were used to select COPCs for surface and subsurface soil:

- RSLs for residential soil (USEPA, May 2012)
- RIDEM DECAs for residential soil (November 2011)

Maximum chemical concentrations in soil were also compared to USEPA risk-based soil screening levels (SSLs) for groundwater protection and to RIDEM GA leachability criteria that were designed to be protective of groundwater at most sites. Existing groundwater data was also used to determine if chemicals are migrating from soil and adversely impacting groundwater. The USEPA SSLs are based on a dilution attenuation factor (DAF) of 1. The SSLs for migration from soil to groundwater and the RIDEM leachability criteria were not used for the selection of COPCs for direct contact exposure; however, they do allow qualitative evaluation of the potential for chemical migration from soil to groundwater. Chemicals with concentrations exceeding the SSLs/RIDEM leachability criteria may potentially migrate from the soil to groundwater in sufficient quantities to pose groundwater quality problems.

The risk-based screening levels used in the COPC selection for soil are presented in Table 5-1.

Screening Levels for Groundwater

Screening levels based on the following criteria were used to select COPCs for groundwater and surface water:

- RSLs for tap water (USEPA, May 2012)
- RIDEM GA groundwater objectives (November 2011)
- USEPA MCLs (April 2012)

- USEPA Groundwater Screening Levels for Evaluating Vapor Intrusion into Indoor Air from Groundwater (May 2012)

Risk-based COPC screening levels for tap water ingestion, which are based on daily residential exposure assumptions, were used to select COPCs for groundwater. In general, the use of tap water screening levels is regarded as a highly conservative approach to COPC selection at the Site because groundwater is not used as a potable water source.

Screening levels from USEPA Vapor Intrusion Screening Level (VISL) Calculator Version 2.0 (USEPA, May 2012) were used for evaluating the vapor intrusion pathway from groundwater to indoor air. The values correspond to a target cancer risk level of 1×10^{-6} , or a hazard index of 0.1 for carcinogens and noncarcinogens, respectively. The vapor intrusion screening criteria assume a subsurface attenuation factor of 0.001 from groundwater concentrations to indoor air concentrations. The vapor intrusion screening criteria were derived to identify chemical concentrations in groundwater that may adversely affect the indoor air quality of a building overlying subsurface VOC contamination.

The risk-based screening levels and health-based standards used in the COPC selection for groundwater are presented in Table 5-2.

Screening Levels for Soil Gas

Soil gas screening levels for evaluating vapor intrusion to indoor air were obtained from USEPA VISL Calculator Version 2.0 (USEPA, May 2012). The soil gas criteria are based on the residential air RSLs and an attenuation factor of 0.1. The risk-based screening levels used in the COPC selection for soil gas are presented in Table 5-3.

Essential Nutrients

Per USEPA guidance (December 1989) "Chemicals that are (1) essential human nutrients, (2) present at low concentrations (i.e., only slightly elevated above natural occurring levels), and (3) toxic at very high doses (i.e., much higher than those that could be associated with contact at the site) need not be considered further in the quantitative risk assessment." Examples of such chemicals are magnesium, calcium, potassium, and sodium. Based on historical information available for the Site, no unusual use or disposal of these constituents occurred at the site under investigation. Soil concentrations greater than 1,000,000 mg/kg (i.e., pure mineral intake) would be required before receptor intake would exceed

recommended daily allowance (RDA) and recommended daily intake (RDI) values. A review of currently available analytical data indicates that such concentrations have not been detected in soil at the Site.

Screening Levels for Chromium

Chromium speciation was not performed on the soil and groundwater samples collected at the site. Therefore, the screening levels for hexavalent chromium were used for the selection of COPCs.

Total Petroleum Hydrocarbons

Petroleum hydrocarbons are not considered to be a CERCLA contaminant. In addition there is no toxicity criteria available to evaluate risks from exposures to petroleum hydrocarbons. Therefore, petroleum hydrocarbons are not evaluated in this HHRA. Petroleum hydrocarbons are discussed in Section 4.2 (Summary of Analytical Results) and in the 1997 SASE Report.

Chemicals without Toxicity Criteria

Due to the lack of toxicity criteria, USEPA RSLs are not available for some chemicals [e.g., acenaphthylene, benzo(g,h,i)perylene, phenanthrene, alpha- and gamma-chlordane, monobutyltin, and tetrabutyltin]. For COPC screening, acenaphthene was used as a surrogate for acenaphthylene, pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene, chlordane was selected as a surrogate for alpha- and gamma-chlordane, and dibutyltin and tributyltin were used as surrogates for monobutyltin and tetrabutyltin, respectively.

Direct contact chemical screening values were not available for carbazole, di-n-octyl phthalate, and creosote. Consequently these chemicals could not be quantitatively evaluated in this HHRA. In addition, screening criteria for protection of migration from soil to groundwater were not available for carbazole, creosote, dibutyltin, monobutyltin, tributyltin, and tetrabutyltin. Therefore, these chemicals were evaluated qualitatively in this HHRA. The uncertainty associated with the lack of screening levels for these chemicals is discussed in Section 5.5.1 in the Uncertainty Analysis.

Background Evaluation

In accordance with Navy policy (DON, 2004) chemicals present at background concentrations were not retained as COPCs in this HHRA. The NAVSTA Newport Basewide Background Study (Tetra Tech, 2008) was used to establish background concentrations for inorganics. The ProUCL software program was used to calculate the 95% UPL to be used as a BTV for Site 19 – On-Shore Derecktor Shipyard.

95% UPLs were calculated from the base background dataset for all surface and subsurface soil types. The soil types were combined because the soil type at the Site is classified as urban fill and is likely a combination of different soil types from other portions of NAVSTA Newport. The results of background analysis are included in Appendix G-1. The background evaluation was conducted in accordance with the following Navy guidance:

- Guidance for Environmental Background Analysis, Volume I: Soil. Prepared by Battelle Memorial Institute, Earth Tech, Inc., and Newfields for the Naval Facilities Engineering Command, Washington D.C., April 2002.

In the COPC selection process, if the results of the background evaluation indicated that chemical concentrations detected in Site soils did not exceed background concentrations, that chemical was not selected as a COPC and was not carried through the quantitative risk assessment. However, chemicals present at concentrations exceeding risk-based screening criteria but not selected as COPCs on the basis of background evaluations are further discussed in the risk characterization section in Section 5.4.3.13. The results of the background comparison analysis for surface soil and subsurface soil are presented in Appendix G. No background data is available for groundwater; consequently, a background comparison could not be performed for the groundwater medium.

The elimination of chemicals as site-related COPCs on the basis of background follows Navy Policy on the Use of Background Chemical Levels (DON, 2004). This document also presents the Navy's interpretation of the USEPA guidance provided in the document titled Role of Background in the CERCLA Cleanup Program (USEPA, 2002), and details the methodology to be used in evaluating background under the Navy's Environmental Restoration and Base Realignment and Closure (BRAC) programs. Navy policy has been accepted by the USEPA as not contradicting the USEPA guidance (USEPA, 2002). Navy policy applies to both the screening-level and baseline risk assessments and requires the following:

1. A clear and concise understanding of chemicals released from a site thus ensuring the Navy is focusing on remediating the release.
2. The use of background data in the screening-level risk assessment.
 - a. The comparison of site chemical levels to risk-based screening criteria.
 - b. The comparison of site chemical levels to background concentrations.
 - c. The identification of site-related COPCs based on screening criteria comparisons and background comparisons. Site-related COPCs are those chemicals with concentrations

exceeding risk-based screening criteria and background concentrations. To the extent possible, site-related COPCs are further evaluated quantitatively in the baseline risk assessment. (Non-site-related COPCs are further discussed in the risk characterization sections of the baseline risk assessment.)

3. The consideration of background in the baseline risk assessment.

- a. The calculation of risk estimates for site-related COPCs only.
- b. The further evaluation of non-site-related COPCs in the risk characterization section only (e.g., the qualitative evaluation of chemicals detected at concentrations exceeding screening criteria but less than background concentrations). The Navy considers this evaluation to be consistent with USEPA's Role of Background in the CERCLA Cleanup Program (USEPA, 2002).

4. The selection of site cleanup remedial goals at levels not less than background levels. Additionally, cleanup levels should not be developed for chemicals not identified as COCs. As defined in the Navy guidance, COCs are site-related COPCs found to be the risk drivers in the baseline risk assessment and that may pose unacceptable human or ecological risks.

5.1.2.2 Decision Rules for Establishing COPCs

The following decision rules were used to select initial lists of COPCs for the Site:

- A chemical detected in soil was selected as a COPC for soil if any detected chemical concentration exceeded the USEPA or RIDEM direct contact screening levels for soil and, for inorganics, if the background evaluation indicates the site concentrations are not within naturally occurring levels. This is shown in Appendix G.
- A chemical detected in groundwater was selected as a COPC for groundwater if the maximum detected concentration in any on-site monitoring wells exceeded the USEPA or RIDEM direct contact screening levels.
- A chemical detected in soil gas was selected as a COPC for soil gas if the maximum detected concentration in soil gas exceeded the USEPA screening levels soil gas.

As indicated in Section 5.1.2.1, chemicals with concentrations exceeding the screening criteria for migration from soil to groundwater were not retained as COPCs for quantitative evaluation in the risk assessment.

5.1.3 COPCs Selected for the HHRA

As previously discussed in Section 1.0, the Site is divided into five areas; the North Waterfront, Central Shipyard, former Building 234, South Waterfront, and the PCB Removal area as illustrated in Figure 1-2. These areas were evaluated separately in this HHRA. Surface soil and subsurface soil samples were collected at the North Waterfront, Central Shipyard, former Building 234, and PCB removal area. Only subsurface soil samples were collected at the South Waterfront. Groundwater samples were only collected at the North Waterfront, Central Shipyard, and former Building 234 area. In addition, soil gas samples were collected at the North Waterfront.

COPCs for these areas were selected using the risk-based COPC screening levels described in Section 5.1.2. A discussion of the chemicals identified as COPCs and the rationale for COPC selection is provided in the following subsections. A discussion of nature and extent of the chemicals detected in site media is presented in Section 4.0 and is not repeated in this section. COPC selection information for each medium is presented in Tables 5-4 through 5-28. Chemicals retained as COPCs for the five areas are presented in Table 5-29. RAGS Part D tables for COPC selection are included in Appendix F.2.

5.1.3.1 North Waterfront Surface Soil

Nine VOCs, 21 SVOCs, 8 pesticides, 20 inorganics, and several miscellaneous chemicals were detected in surface soil samples collected at the North Waterfront portion of the Site. A comparison of maximum detected surface soil concentrations to screening levels based on RSLs and RIDEM DEC for residential exposures is presented in Table 5-4. The following chemicals were detected at maximum concentrations exceeding direct contact COPC screening levels and were retained as COPCs for surface soil at the North Waterfront:

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene].
- Inorganics (chromium, cobalt, and iron).

The maximum detected concentration of cobalt and iron exceeded the screening toxicity levels (set at a HQ of 0.1); however, they do not exceed the RSLs. Concentrations of benzo(a)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and chromium exceeded the screening criteria based on the RSLs, but were less than the RIDEM DEC. Concentrations of chrysene exceeded its RIDEM DEC, but were less than the screening criteria based on the RSLs. Concentrations of aluminum, arsenic, and manganese also exceeded the screening levels but were within naturally occurring levels and are not

considered to be site related (Appendix G), therefore these chemicals were not retained as COPCs for direct contact with surface soil.

A comparison of maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-5. The following chemicals were detected in surface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at the North Waterfront:

- VOCs [benzene and TCE]
- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, hexachloroethane, naphthalene, and 2,2'-oxybis(1-chloropropane)].
- Pesticides (alpha-chlordane, Dieldrin, gamma-chlordane, and heptachlor epoxide).
- Metals (cadmium, chromium, copper, lead, nickel, selenium, and zinc).

Of these chemicals, only TCE, chromium, copper, nickel, and zinc were detected in groundwater samples collected at the North Waterfront. Concentrations of lead in toxicity characteristic leaching procedure (TCLP) samples also exceeded the RIDEM GA leachability criteria. Lead was the only chemical detected at concentrations exceeding the RIDEM GA leachability criteria. Concentrations of arsenic, manganese, and mercury also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G). As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for dibutyltin, monobutyltin, tetrabutyltin, and tributyltin. The uncertainty associated with the lack of screening criteria for these chemicals is discussed in Section 5.5.1, the Uncertainty Analysis.

5.1.3.2 North Water Front Subsurface Soil

Seven VOCs, 18 SVOCs, 5 pesticides/PCBs, 20 inorganics, and several miscellaneous chemicals were detected in subsurface soil at the North Waterfront. A comparison of maximum detected subsurface soil concentrations to screening levels based on the RSLs and RIDEM DEC's for residential exposure is presented in Table 5-6. The following chemicals were detected at maximum concentrations exceeding direct contact COPC screening levels and were retained as COPCs for subsurface soil at the North Waterfront:

- SVOCs [benzo(a)pyrene and dibenzo(a,h)anthracene]
- Inorganics (aluminum, chromium, cobalt, and iron).

Concentrations of benzo(a)pyrene, dibenzo(a,h)anthracene, and chromium exceeded screening criteria based on RSLs, but were less than the RIDEM DECs. Concentrations of arsenic and manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G); therefore these chemicals were not retained as COPCs for direct contact with subsurface soil.

A comparison of maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-7. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at the North Waterfront:

- VOCs (TCE).
- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, dibenzo(a,h)anthracene, and naphthalene].
- Pesticides/PCBs (Aldrin, alpha-chlordane, and heptachlor).
- Metals (arsenic, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, and selenium).

Of these chemicals, only TCE, arsenic, cadmium, chromium, copper, iron, and nickel were detected in groundwater samples collected at the North Waterfront. Concentrations of lead in TCLP samples also exceeded the RIDEM GA leachability criteria. Lead was the only chemical detected at concentrations exceeding the RIDEM GA leachability criteria. Concentrations of manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G). As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for tetrabutyltin and tributyltin. The uncertainty associated with the lack of screening criteria for these chemicals is discussed in Section 5.5.1, the Uncertainty Analysis.

5.1.3.3 North Waterfront Groundwater

Seven VOCs and 13 inorganics were detected in groundwater samples collected at the North Waterfront. A comparison of maximum detected groundwater concentrations to screening levels based on RSLs for tap water, USEPA MCLs, and RIDEM GA groundwater objectives is presented in Table 5-8. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at the North Waterfront:

- VOCs (cis-1,2-dichloroethene, TCE, and vinyl chloride).
- Metals (Total) [aluminum, arsenic, chromium, iron, and manganese]
- Metals (Dissolved) [aluminum and manganese].

Concentrations of cis-1,2-dichloroethene and manganese exceeded screening toxicity levels (set at a HI of 0.1) but did not exceed RSLs. TCE and arsenic were the only chemicals detected at a concentration exceeding the RIDEM GA groundwater objectives.

A comparison of maximum detected groundwater VOC concentrations to USEPA screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in Table 5-9. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at the North Waterfront:

- VOCs (TCE, and vinyl chloride).

5.1.3.4 North Waterfront Soil Gas

Thirty-five VOCs were detected in soil gas samples collected at the North Waterfront. A comparison of maximum detected soil gas concentrations to USEPA screening levels is presented in Table 5-10. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for soil gas at the North Waterfront:

- VOCs (1,3-butadiene, acrylonitrile, benzene, tetrachloroethene and TCE).

1,3-Butadiene and acrylonitrile were not detected in any surface soil, subsurface soil, or groundwater samples collected at the North Waterfront.

5.1.3.5 Central Shipyard Surface Soil

Eighteen SVOCs, 3 pesticides/PCBs, 20 inorganics, and several miscellaneous chemicals were detected in surface soil samples collected at the Central Shipyard. A comparison of maximum detected surface soil concentrations to screening levels based on RSLs and RIDEM DEC values for residential exposure is presented in Table 5-11. The following chemicals were detected at maximum concentrations exceeding the direct contact COPC screening levels, and were retained as COPCs for surface soil at the Central Shipyard:

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene].
- Inorganics (arsenic, chromium, cobalt, iron, and manganese).

The maximum detected concentration cobalt, iron, and manganese exceeded screening toxicity levels (set at a HQ of 0.1) but did not exceed RSLs. Concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chromium exceeded the screening criteria based on the RSLs but were less than the RIDEM DEC values. Concentrations of chrysene exceeded RIDEM DEC values but were less than the screening criteria based on the RSLs. Concentrations of aluminum also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore aluminum was not retained as a COPC for direct contact with surface soil.

There are no direct contact COPC screening criteria available for carbazole. The uncertainty associated with the lack of screening criteria for carbazole is discussed in Section 5.5.1, the Uncertainty Analysis.

A comparison of the maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-12. The following chemicals were detected in surface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at Central Shipyard:

- SVOCs [2,2'-oxybis(1-chloropropane), 4-methylphenol, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene].
- Pesticides/PCBs (Aroclor-1260).
- Metals (arsenic, cadmium, chromium, cobalt, copper, iron, manganese, nickel, and selenium).

SVOCs and copper were not detected in groundwater samples collected at the Central Shipyard. Concentrations of all chemicals were less than the RIDEM GA leachability criteria. Concentrations of arsenic in TCLP samples were less than the RIDEM GA leachability criteria. Concentrations of lead and

mercury exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G). As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for carbazole, creosote, tetrabutyltin, and tributyltin. The uncertainty associated with the lack of screening criteria for these chemicals is discussed in Section 5.5.1, the Uncertainty Analysis.

5.1.3.6 Central Shipyard Subsurface Soil

Five VOCs, 18 SVOCs, 5 pesticides/PCBs, 20 inorganics, and two miscellaneous chemicals were detected in subsurface soil samples at the Central Shipyard. A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs and RIDEM DEC for residential exposure is presented in Table 5-13. The following chemicals were detected at maximum concentrations exceeding the direct contact COPC screening levels and were retained as COPCs for subsurface soil at the Central Shipyard:

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene].
- Inorganics (aluminum, arsenic, chromium, cobalt, and iron).

Concentrations of dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and chromium exceeded the screening criteria based on the RSLs but were less than the RIDEM DEC. Concentrations of chrysene exceeded RIDEM DEC, but were less than the screening criteria based on the RSLs. Concentrations of manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore manganese was not retained as a COPC for direct contact with subsurface soil.

A comparison of maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-14. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at the Central Shipyard:

- SVOCs [2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene].

- Pesticides/PCBs (4,4'-DDD, 4,4'-DDT, total Aroclors)
- Metals (arsenic, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, selenium, and silver).

Lead was the only chemical detected at concentrations exceeding the RIDEM GA leachability criteria. SVOCs, copper, mercury, and silver were not detected in groundwater samples collected at the Central Shipyard. Concentrations of manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G). As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for tetrabutyltin and tributyltin. The uncertainty associated with the lack of screening criteria for these chemicals is discussed in Section 5.5.1, the Uncertainty Analysis.

5.1.3.7 Central Shipyard Groundwater

Acetone and 16 metals were detected in groundwater samples collected at Central Shipyard. A comparison of maximum detected groundwater concentrations to screening levels based on RSLs for tap water, USEPA MCLs, and RIDEM GA groundwater objectives is presented in Table 5-15. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at the Central Shipyard:

- Metals (Total) (aluminum, arsenic, cadmium, chromium, cobalt, iron, and manganese).
- Metals (Dissolved) (arsenic, cadmium, cobalt, iron, and manganese).

Concentrations of all chemicals with the exception of arsenic were less than the RIDEM GA groundwater objectives.

A comparison of maximum detected groundwater VOC concentrations to USEPA screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in Table 5-16. Concentrations of all chemicals were less than the associated screening levels.

5.1.3.8 Former Building 234 Surface Soil

Two VOCs, 18 SVOCs, 6 pesticides/PCBs, 20 inorganics, and 2 miscellaneous chemicals were detected in surface soil samples collected at former Building 234. A comparison of maximum detected surface soil concentrations to screening levels based on RSLs and RIDEM DECs for residential exposure is presented in Table 5-17. The following chemicals were detected at maximum concentrations exceeding the direct contact COPC screening levels and were retained as COPCs for surface soil at former Building 234:

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene].
- Inorganics (arsenic, beryllium, cadmium, chromium, cobalt, iron, lead, and manganese).

The maximum detected concentrations of cadmium, iron, and manganese exceeded screening toxicity levels (set at a HQ of 0.1), but did not exceed RSLs. Concentrations of benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene, cadmium, and chromium exceeded the screening criteria based on the RSLs, but were less than the RIDEM DECs. Concentrations of chrysene, beryllium, and lead exceeded RIDEM DECs, but were less than the screening criteria based on the RSLs. Concentrations of aluminum also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore aluminum was not retained as COPCs for direct contact with surface soil.

There are no COPC screening criteria available for carbazole and creosote. The uncertainty associated with the lack of screening criteria for carbazole and creosote is discussed in Section 5.5.1, the Uncertainty Analysis.

A comparison of the maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-18. The following chemicals were detected in surface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at former Building 234:

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene].
- Pesticides/PCBs (Aroclor-1254, gamma-chlordane, and heptachlor).

- Metals (arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, and zinc).

Selenium was not detected in groundwater samples collected at former Building 234. Lead was the only chemical detected at concentrations exceeding the RIDEM GA leachability criteria. As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for carbazole, creosote, di-n-octyl phthalate, tetrabutyltin, and tributyltin. The uncertainty associated with the lack of screening criteria for these chemicals is discussed in Section 5.5.1, the Uncertainty Analysis.

5.1.3.9 Former Building 234 Subsurface Soil

Six VOCs, 16 SVOCs, heptachlor, 21 inorganics, and tetrabutyltin were detected in subsurface soil samples at the Former Building 234. A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs and RIDEM DECs for residential exposure is presented in Table 5-19. The following chemicals were detected at maximum concentrations exceeding the direct contact COPC screening levels and were retained as COPCs for subsurface soil at former Building 234:

- SVOCs [benzo(a)pyrene].
- Inorganics (aluminum, arsenic, chromium, cobalt, and iron).

Concentrations of benzo(a)pyrene and chromium exceeded the screening criteria based on the RSLs, but were less than the RIDEM DECs. Concentrations of manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore manganese was not retained as a COPC for direct contact with subsurface soil.

A comparison of maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-20. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at former Building 234:

- VOCs (benzene, ethylbenzene, and TCE)

- SVOCs [2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, naphthalene]
- Pesticides/PCBs (heptachlor)
- Metals (aluminum, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, and silver)

Naphthalene was the only chemical detected at concentrations exceeding the RIDEM leachability criteria. Of these chemicals, only TCE, arsenic, and nickel were detected in groundwater samples collected at former Building 234. As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

There are no USEPA SSLs or RIDEM GA leachability criteria available for creosote and tetrabutyltin. The uncertainty associated with the lack of screening criteria for creosote and tetrabutyltin is discussed in Section 5.5.1, the Uncertainty Analysis.

5.1.3.10 Former Building 234 Groundwater

Six VOCs and 16 metals were detected in groundwater samples collected at former Building 234. A comparison of maximum detected groundwater concentrations to screening levels based on RSLs for tap water, USEPA MCLs, and RIDEM GA groundwater objectives is presented in Table 5-21. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at former Building 234:

- VOCs (cis-1,2-dichloroethene, TCE, and vinyl chloride)
- Metals (Total) (aluminum, arsenic, chromium, cobalt, iron, and manganese)
- Metals (Dissolved) (arsenic, cobalt, iron, and manganese)

The maximum detected concentrations of cis-1,2-dichloroethene, cobalt (total and dissolved), iron (total), and manganese (dissolved) exceeded screening toxicity levels (set at a HQ of 0.1), but did not exceed RSLs. Vinyl chloride and arsenic were the only chemicals detected at a concentration exceeding the RIDEM GA groundwater objectives.

A comparison of maximum detected groundwater VOC concentrations to USEPA screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in

Table 5-22. The following chemicals were detected at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at former Building 234:

- VOCs (TCE and vinyl chloride)

5.1.3.11 South Waterfront Subsurface Soil

Three PAHs and 18 inorganics were detected in subsurface soil at the South Waterfront. A comparison of maximum detected subsurface soil concentrations to screening levels based on the RSLs and RIDEM DEC's for residential exposure is presented in Table 5-23. The following chemicals were detected at maximum concentrations exceeding direct contact COPC screening levels and were retained as COPCs for subsurface soil at the South Waterfront:

- Inorganics (aluminum, arsenic, chromium, cobalt, and iron)

Concentrations of manganese also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore manganese was not retained as a COPC for direct contact with subsurface soil.

A comparison of maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-24. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at the South Waterfront:

- PAHs [benzo(b)fluoranthene]
- Metals (arsenic, cadmium, chromium, cobalt, copper, iron, lead, and nickel)

Concentrations of all chemicals were less than the RIDEM GA leachability criteria. As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

5.1.3.12 PCB Removal Area Surface Soil

Seventeen PAHs, Aroclor-1260, and 20 inorganics were detected in surface soil samples collected at the PCB removal area. A comparison of maximum detected surface soil concentrations to screening levels

based on RSLs and RIDEM DEC values for residential exposure is presented in Table 5-25. The following chemicals were detected at maximum concentrations exceeding the direct contact risk-based COPC screening levels and were retained as COPCs for surface soil at the PCB removal area:

- PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene]
- PCBs (Aroclor-1260, Total Aroclors)
- Inorganics (arsenic, cobalt, iron, and manganese)

The maximum detected concentration of manganese exceeded screening toxicity levels (set at a HQ of 0.1) but did not exceed RSLs. Concentrations of total Aroclors exceeded the screening criteria based on the RSLs but were less than the RIDEM DEC values. Concentrations of benzo(g,h,i)perylene and chrysene exceeded RIDEM DEC values but were less than the screening criteria based on the RSLs. Concentrations of aluminum and chromium also exceeded the screening levels but were within naturally occurring levels and are not considered to be site related (Appendix G), therefore these chemicals were not retained as COPCs for direct contact with surface soil.

A comparison of the maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-26. The following chemicals were detected in surface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at PCB removal area:

- PAHs [2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene]
- PCBs (Aroclor-1260 and total Aroclors)
- Metals (arsenic, cadmium, cobalt, copper, iron, lead, manganese, nickel, and selenium).

Concentrations of all chemicals were less than the RIDEM GA leachability criteria when available. Concentrations of chromium also exceeded the screening levels, but were within naturally occurring levels and are not considered to be site related (Appendix G). As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

5.1.3.13 PCB Removal Area Subsurface Soil

Seventeen PAHs, total Aroclors, and 21 metals were detected in subsurface soil samples at the PCB Removal area. A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs and RIDEM DECs for residential exposure is presented in Table 5-27. The following chemicals were detected at maximum concentrations exceeding the direct contact risk-based COPC screening levels and were retained as COPCs for subsurface soil at the PCB removal area:

- PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene]
- Inorganics (aluminum, arsenic, chromium, cobalt, iron, and manganese)

The maximum detected concentrations of aluminum, iron, and manganese exceeded screening toxicity levels (set at a HQ of 0.1) but did not exceed RSLs. Concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and chromium exceeded the screening criteria based on the RSLs, but were less than the RIDEM DECs.

A comparison of maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater and RIDEM GA leachability criteria is presented in Table 5-28. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the screening levels for migration from soil to groundwater at the PCB removal area:

- PAHs [2-methylanthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, naphthalene]
- PCBs (Total Aroclors)
- Metals (antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, and zinc)

Concentrations of all chemicals were less than the RIDEM GA leachability criteria when available. As discussed in Section 5.1.2.1, chemicals detected at concentrations exceeding the SSLs for migration from soil to groundwater and RIDEM GA leachability criteria were not retained as COPCs for quantitative evaluation in this HHRA.

5.1.3.14 Summary

Table 5-29 summarizes the chemicals retained as COPCs for direct contact exposures to surface soil, subsurface soil, groundwater, and soil gas at the North Waterfront, Central Shipyard, former Building 234,

South Waterfront, and PCB removal area. RAGS Part D tables for COPC selection are included in Appendix F.2.

5.2 EXPOSURE ASSESSMENT

The exposure assessment portion of the risk assessment defines and evaluates, quantitatively or qualitatively, the type and magnitude of human exposure to the chemicals present at or migrating from a site. The exposure assessment is designed to depict the physical setting of the site, to identify potentially exposed populations and applicable exposure pathways, to calculate concentrations of COPCs to which receptors might be exposed, and to estimate chemical intakes under the identified exposure scenarios.

Actual or potential exposures at the Site were determined based on the most likely pathways of contaminant release and transport, as well as human activity patterns. A complete exposure pathway has three components: a source of chemicals that can be released to the environment, a route of contaminant transport through an environmental medium, and an exposure or contact point for a human receptor.

5.2.1 Conceptual Site Model

A conceptual site model (CSM) facilitates consistent and comprehensive evaluation of potential risks to human health by creating a framework for identifying the pathways by which human receptors may come in contact with environmental media contaminated by site activities. A CSM depicts the relationships among the following elements, which are necessary for defining complete exposure pathways:

- Site sources of contamination
- Contaminant release mechanisms and transport/migration pathways
- Exposure routes
- Potential receptors

The elements of the CSM (contaminant source, release mechanisms, transport/migration pathways, exposure routes, and potential receptors) establish the manner and degree to which a potential receptor may be exposed to chemicals present at the site. The degree of risk incurred by a potential receptor varies according to the means of exposure, the duration of exposure, and the specific chemical to which the receptor is exposed.

Section 1 and 2 of this document presented a detailed discussion on site location, site description, and site history for the five subareas of the Site. This section summarizes the information previously presented in Section 2.0 as it applies to the HHRA. Sources of contamination, contaminant release mechanisms, transport and migration pathways, exposure routes, and potential receptors are defined. Table 5-30 provides a site-specific summary of the potential receptors evaluated for the Site. A summary of the exposure routes addressed quantitatively for each human receptor is provided in Table 5-31. Figure 5-1 illustrates the CSM for the Site.

5.2.1.1 Site Sources of Environmental Contamination

Summarizing from the Site history information presented in Section 1, the Site was leased by the Navy to the Rhode Island Port Authority who in turned leased the property to the Derecktor Shipyard. The Derecktor Shipyard operated from 1979 to January 1992. The Site was used by Derecktor to repair, maintain, and construct private and military ships. Repair, maintenance, and construction operations were concentrated in the Building 234 area. These operations consisted of sand blasting, painting, hull inspections, and other on-board ship repairs.

Derecktor also constructed new ships under contract to the USCG and U.S. Army. These ships were steel-structured, such as cutters and tugboats, built from the keel up, and outfitted for initial sea trials. Construction included cutting and welding steel, sand blasting, priming and painting the structure, and final ship assembly, which was completed primarily in Building 234. Supporting the ship maintenance and construction operations was an engineering department, a machine shop, an electrical shop, a pipe shop, and a vehicle maintenance shop.

5.2.1.2 Potential Contaminant Release Mechanisms and Transport/Migration Pathways

The soil and groundwater data collected at the Site indicate that past activities have released contaminants to the surrounding environment. Once chemicals have been released to an environmental medium (e.g., soil), they may migrate within that medium, or migrate to another environmental medium (e.g., air). This section summarizes potential containment release mechanisms and transport pathways.

Contaminants in surface soil could migrate to air through wind erosion or through volatile emissions. Subsurface soil is not currently exposed at the site; however, if future construction occurs and brings subsurface soil to the surface, contaminants in subsurface soil could be transported into the air through wind erosion or through volatile emissions (fugitive dusts) may then be deposited off site if the grain size is small enough and the wind speed is great enough. Additionally, contaminants may be released from soil

by volatilization if present at significant concentrations. However, portions of the Site are paved which significantly limits the potential for airborne emissions from the Site.

Contaminants can also migrate from both surface and subsurface soil to groundwater through leaching of chemicals in the soil. The groundwater underlying the Site is primarily recharged through infiltration of precipitation and subsurface flow from upgradient/adjacent areas. This allows for migration of contaminants downward through the buried wastes/soil column to the shallow groundwater. Shallow groundwater at the site discharges to Narragansett Bay.

5.2.1.3 Potential Current and Future Receptors of Concern and Exposure Pathways

The baseline HHRA prepared for the Site considered receptor exposure under residential and non-residential (e.g., industrial, recreational) land-use scenarios. The following receptors were identified in the previous HHRA (B&RE, January 1997):

- **Industrial Worker** – A plausible receptor under current and future land use. This receptor could be directly exposed to surface soil (incidental ingestion; dermal contact) and airborne particulates and vapors from surface soil (inhalation). Under current land use the industrial worker could only be exposed to surface soil in the unpaved areas of the Site. Under future land use the industrial worker could be exposed to all surface soil if the pavement at the Site was removed. Figure 1-2 shows the unpaved and paved areas. If groundwater was used as a drinking water supply then the industrial worker could be exposed to groundwater (ingestion; dermal contact). Industrial worker exposure to subsurface soil is unlikely; however, because future construction could potentially bring subsurface soil to the surface, exposure to subsurface soil via incidental ingestion, dermal contact, and inhalation was evaluated for this receptor to aid in risk management decisions. If this receptor worked in a hypothetical on-site structure, it is also plausible that this receptor could be exposed to VOCs migrating from contaminated subsurface soil or groundwater to the indoor air of a building.
- **Construction Workers** – A plausible on-site receptor under current and future land use. Construction workers could be exposed to surface and subsurface soils (incidental ingestion; dermal contact), shallow groundwater (dermal contact), as well as airborne contaminants emanating from these media (inhalation). It should be noted that significant exposure to groundwater by a construction worker is unlikely because if a construction worker were to have prolonged contact with groundwater then he/she would most likely wear protective clothing such as rubber boots and/or hip waders, which would limit the receptor's exposure. In addition, most excavation activities would utilize construction equipment such as a back hoe, which would limit a construction worker's exposure. Also, if significant groundwater was encountered during an excavation of a trench or

foundation, the groundwater would most likely be pumped out of the excavation so that the construction activities could be completed.

- **Adolescent and Adult Trespassers** – A plausible receptor under current and future land use. Trespassers are individuals using the site for passive activities including walking or hiking two days a week during the warmer months of the year (mid-April through mid-October). A trespasser may be exposed to potentially contaminated surface soil (incidental ingestion; dermal contact), air (inhalation). Under current land use trespassers could only be exposed to surface soil in the unpaved areas of the Site. Under future land use trespassers could be exposed to all surface soil if the pavement at the Site was removed. Trespasser exposure to subsurface soil is unlikely; however, because future construction could potentially bring subsurface soil to the surface, exposure to subsurface soil via incidental ingestion, dermal contact, and inhalation was evaluated for this receptor to aid in risk management decisions. Direct contact with groundwater is not anticipated for this receptor.
- **Hypothetical Child and Adult Residents** – Given the anticipated future land use for much of the Site (commercial/industrial), residents are a very unlikely future receptor. However, the hypothetical future residential scenario is typically evaluated in a risk assessment for decision-making purposes. For example, the need for deed restrictions at a site may be eliminated prior to site closure if minimal risks are estimated for residential receptors. It is assumed that a hypothetical resident may be exposed to surface soil (ingestion; dermal contact, inhalation), groundwater (ingestion; dermal contact, inhalation), and air (inhalation). Also, hypothetical residents could be exposed to VOCs migrating from contaminated subsurface soil or groundwater to the indoor air of a home. Receptor exposure to subsurface soil would only occur if subsurface soil was excavated and deposited on existing surface soil. Although this is an unlikely scenario, it is included in this HHRA for purposes of completeness and to assist the risk managers regarding the need for deed restrictions.

5.2.2 Exposure Point Concentrations

The exposure point concentration (EPC), which is calculated for COPCs only (both site related and non-site related [i.e., naturally occurring/non-site-related anthropogenic chemicals]), is an estimate of the chemical concentration within an exposure unit (EU). The EPC is assumed to be the concentration to which the receptor is exposed and is used to estimate exposure intakes. An EU is the area over which receptor activity is expected to occur. The following paragraphs discuss the EUs evaluated in this HHRA and the guidelines for calculating EPCs.

As previously discussed, the North Waterfront, Central Shipyard, former Building 234, South Waterfront, and PCB Removal area were evaluated as separate EUs (Figure 1-2). EPCs were calculated for surface

soil (0 – 2 ft bgs), subsurface soil (> 2 ft bgs), and groundwater. Soils were differentiated from surface and subsurface in anticipation of any future removal actions which would target the surface soil interval.

The following guidelines were used to calculate EPCs:

- For surface soil and subsurface soil the 95-percent upper confidence limit (UCL) on the arithmetic mean, which was based on the distribution of the data set, was selected as the EPC. EPCs were calculated following USEPA's Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (December 2002) and using USEPA's ProUCL software Version 4.1.01. If ProUCL was unable to calculate an UCL then the maximum detected concentration was used as the EPC. The uncertainty associated with using the maximum detected concentration as the EPC is discussed in the uncertainty analysis in Section 5.2.2.
- Two EPCs were calculated for surface soil. The first EPC was calculated using only surface soil samples for the unpaved areas in each EU. This EPC was used to evaluate exposures to surface soil for all receptors with the exception of construction workers under the current land use scenario. The second EPC was calculated assuming the pavement was removed at each EU and therefore the receptors could be exposed to all surface soil. Figure 1-2 shows the unpaved and paved areas. The second EPC was used to evaluate surface soil under future land use. The second EPC was also used to evaluate exposures to construction workers under the current land use scenario. Appendix F.1 identifies the samples for the paved and unpaved areas. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene were identified as COPCs in surface soil at the Central Shipyard. COPCs were selected using all surface soil samples for the paved and unpaved area. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene were not detected in surface soil samples from the unpaved areas in the Central Shipyard, therefore these chemicals were not evaluated in this HHRA.
- The groundwater samples were collected in 1996 and 2011. All groundwater samples were used to identify COPCs for groundwater, but only the 2011 groundwater samples were used to evaluate potential exposures to groundwater since this data is representative of the current conditions at the Site. There were not enough groundwater samples available to calculate an UCL therefore the maximum detected concentration in the 2011 groundwater samples was used as the EPC for groundwater. Appendix F.1 lists the samples which were used to derive the EPCs for groundwater. Arsenic was identified as a COPC in groundwater at the North Waterfront and chromium was identified as a COPC in groundwater at the Central Shipyard and Former Building 234. These compounds were detected in groundwater samples collected in 1996 but were not detected in the latest groundwater samples collected in 2011. Therefore, exposures to arsenic in groundwater at the

North Waterfront and chromium in groundwater at the Central Shipyard and Former Building 234 were not evaluated in this HHRA.

- Non-detected values were evaluated in accordance with the ProUCL guidance. Duplicates were averaged for purposes of calculating EPCs for COPCs in environmental media. In calculating the averages, if one sample was detected and the other was non-detected then the average was calculated using the detected value and one half the non-detected value.
- As stated in the guidance manual for the Integrated Exposure Uptake Biokinetic (IEUBK) model (USEPA, 1994) the arithmetic mean concentration will be used as the EPC for lead.
- The same EPCs were used to evaluate both reasonable maximum exposure (RME) and central tendency exposure (CTE) scenarios.

Table 5-32 summarizes the EPCs used in this HHRA. ProUCL Outputs are included in Appendix F.3. RAGS Part D Tables for the EPCs are presented in Appendix F.2. Appendix F.1 lists the samples which were used to derive the EPCs for soil and groundwater.

5.2.3 Chemical Intake Estimation

The methodologies and techniques used to estimate exposure intakes are presented in this section. Intakes for the identified potential receptor groups were calculated using current USEPA risk assessment guidance and are presented in the risk assessment spreadsheets. Risk assessment results are presented using USEPA RAGS Part D table format. Assumptions regarding exposure are presented in Table 5-33. The exposure assumptions presented in Table 5-33 are based on current USEPA and RIDEM risk assessment guidance and are the same as those used in the HHRAs for Site 8 (NUSC) (Tetra Tech, January 2010) and Tank Farm 4 and 5 (Tetra Tech, January 2011) at NAVSTA Newport.

Non-carcinogenic intakes were estimated using the concept of an average annual exposure. Carcinogenic intakes were calculated as incremental lifetime exposures, which assume a life expectancy of 70 years. The exposure assumptions reflect current USEPA guidance. The majority of the exposure assumptions used to estimate chemical intakes were based on default assumptions described in several USEPA guidance documents (e.g., USEPA December 1989, March 1991, August 1997, and July 2004) and RIDEM guidance (February 2004). The RIDEM guidance only contains exposure assumptions for industrial workers and residents exposed to soil via incidental ingestion and inhalation routes of exposure. RIDEM does not have default exposure assumptions for construction workers, trespassers, or recreational users. The following paragraphs discuss the non-default receptor-specific exposure assumptions used in the risk assessment.

5.2.3.1 Incidental Ingestion of Soil

Direct physical contact with soil may result in the incidental ingestion of chemicals. Chemical intake for the incidental ingestion of soil is estimated in the following manner (USEPA, December 1989):

$$\text{Intake} = \frac{(C_s)(IR)(FI)(EF)(ED)(CF)}{(BW)(AT)}$$

where:

Intake	=	intake of chemical from soil (mg/kg/day)
C _s	=	concentration of chemical in soil (mg/kg)
IR	=	ingestion rate (mg/day)
FI	=	fraction ingested from contaminated source (dimensionless)
EF	=	exposure frequency (days/year [yr])
ED	=	exposure duration (yr)
CF	=	conversion factor (1 x 10 ⁻⁶ kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days); for non-carcinogens, AT = ED x 365 days/yr for carcinogens, AT = 70 yr x 365 days/yr

Most of the exposure assumptions used to estimate chemical intakes from incidental ingestion of soil were based on default assumptions described in standard USEPA guidance and are summarized in Table 5-33. The following paragraphs briefly discuss the non-default receptor-specific exposure assumptions for incidental ingestion of soil that were used in the HHRA.

The selected exposure frequency assumptions consider anticipated receptor activities at the Site. It is assumed that construction workers assigned to future excavation projects at the Site are exposed to soil for 5 days a week over 6 months (130 days a year) for 1 year. It is assumed that adolescent and adult trespassers are exposed to soil for 2 days per week over 24 weeks (48 days a year).

5.2.3.2 Dermal Contact with Soil

Direct physical contact with soil may result in the dermal absorption of chemicals. Exposure associated with dermal contact with soil is estimated in the following manner (USEPA, December 1989):

$$\text{Intake} = \frac{(C_s)(SA)(AF)(ABS)(CF)(EF)(ED)}{(BW)(AT)}$$

where:

Intake	=	amount of chemical absorbed during contact with soil (mg/kg/day)
C_s	=	concentration of chemical in soil (mg/kg)
SA	=	skin surface area available for contact (cm ² /day)
AF	=	skin adherence factor (mg/cm ²)
ABS	=	absorption factor (dimensionless)
CF	=	conversion factor (1 x 10 ⁻⁶ kg/mg)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
BW	=	body weight (kg)
AT	=	averaging time (days); for non-carcinogens, AT = ED x 365 days/year for carcinogens, AT = 70 years x 365 days/year

Most of the exposure assumptions used to estimate chemical intakes from dermal contact with soil were based on the default assumptions described in standard USEPA guidance and are summarized in Table 5-33. The following paragraphs briefly discuss non-default receptor-specific exposure assumptions for dermal contact with soil that were used in the HHRA.

The exposed skin surface areas of the body available for dermal contact with soil were determined on a receptor-specific basis because they correspond with assumed human activities and clothing worn during exposure events. With the exception of the skin surface area recommended for adolescent trespassers exposed to soil, all of the skin surface areas presented in Table 5-33 are based on USEPA default values. Current guidance (USEPA August 1997 and July 2004) was used to develop the skin surface area available for contact for the adolescent trespasser as follows:

- For the adolescent trespasser, the skin surface area available for soil contact is 5,500 cm² (which assumes that the head, forearms, hands, lower legs, and feet are exposed).

A summary of the receptor-specific input values used to estimate chemical intakes from dermal contact with soil are presented in Table 5-33. The same exposure frequencies and durations recommended for the evaluation of incidental ingestion of soil were used to estimate chemical intakes for dermal contact with soil. The soil adherence factors presented are those in Exhibits 3.3 and 3.5 of RAGS Part E.

To the extent possible, chemical-specific dermal absorption factors provided in RAGS Part E were used to evaluate the COPCs for soil. However, dermal absorption factors are only available for the short list of chemicals in Exhibit 3-4 of RAGS Part E. In addition, as indicated in RAGS Part E, absorption factors for metals other than arsenic and cadmium have not been developed due to insufficient data to support default values. Therefore, ABS was set equal to zero for these chemicals and risks from dermal absorption of metals other than arsenic and cadmium from soil were not quantified in this risk assessment. The uncertainty associated with the omission of these constituents is discussed in the uncertainty analysis. Dermal absorption values used in this HHRA are presented in Table 5-34.

5.2.3.3 Inhalation of Air Containing Fugitive Dust/Volatiles Emitted from Soil

Intakes of both particulates and vapors/gases are calculated using the same equation, as follows (USEPA, January 2009):

$$EC = \frac{(C_{air})(ET)(EF)(ED)}{AT \times 24 \text{ hrs / day}}$$

where:

EC	=	exposure concentration (mg/m ³)
C _{air}	=	concentration of chemical in air (mg/m ³)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
AT	=	averaging time (hours);
	=	for non-carcinogens, AT = ED x 365 days/yr
	=	for carcinogens, AT = 70 yr x 365 days/yr

Some of the exposure assumptions used to estimate chemical intakes from inhalation of fugitive dusts/volatile emissions from surface and subsurface soil were based on default assumptions described in standard USEPA guidance and are summarized in Table 5-33. The same exposure frequencies and durations used to estimate incidental ingestion of soil intakes were used to estimate exposure via inhalation of fugitive dust/volatile emissions for surface and subsurface soil.

The concentrations of chemicals in air resulting from emissions from soil are developed following procedures presented in USEPA Soil Screening Guidance (December 2002). Chemical concentrations in air were calculated as follows:

$$C_{air} = C_{soil} \times \left[\frac{1}{PEF} + \frac{1}{VF} \right]$$

where:

C_{air}	=	chemical concentration in air (mg/m ³)
C_s	=	chemical concentration in soil (mg/kg)
PEF	=	Particulate emission factor (m ³ /kg)
VF	=	volatilization factor (m ³ /kg)

No volatile chemicals were retained as COPCs in surface and subsurface soil, therefore the above equation reduces to:

$$C_{air} = C_{soil} \times \left[\frac{1}{PEF} \right]$$

The particulate emissions factor (PEF) relates the concentration of the chemical in soil to the concentration of dust particles in air. A PEF value of $1.1 \times 10^{+10}$ m³/kg was obtained from USEPA's Soil Screening internet site at <http://rais.ornl.gov/epa/ssl1.shtml>. This is the default value for Hartford, Connecticut, which is the closest city to the Site listed on the Internet site. Because air emissions resulting from fugitive dust emissions settings will be different than dust emissions generated during construction activities, a separate PEF was used for construction activities. The PEF for construction workers ($1.4 \times 10^{+6}$ m³/kg) was calculated using the equations presented in the supplemental SSL guidance document (USEPA, December 2002). Sample calculations showing how the PEFs were calculated are presented in Appendix F.4.

5.2.3.4 Ingestion of Groundwater

Ingestion of groundwater is expected to be limited to exposure that would occur under a future construction, industrial, and residential scenario. Intakes associated with ingestion of groundwater were evaluated using the following equation (USEPA, December 1989):

$$\text{Intake} = \frac{(C_w)(IR_w)(EF)(ED)}{(BW)(AT)}$$

where:

Intake	=	intake of chemical from groundwater (mg/kg/day)
C_w	=	concentration of chemical in groundwater (mg/L)
IR_w	=	ingestion rate for groundwater (L/day)
EF	=	exposure frequency (days/yr)

ED	=	exposure duration (yr)
BW	=	body weight (kg)
AT	=	averaging time (days); for non-carcinogens, AT = ED x 365 days/yr for carcinogens, AT = 70 yrs x 365 days/yr

USEPA standard default exposure assumptions were used to evaluate residential exposures to groundwater. The following paragraphs briefly discuss non-default receptor-specific exposure assumptions for ingestion of groundwater that were used in the HHRA.

Groundwater ingestion rates used in the previous HHRA (B&RE, January 1997) were used for the construction worker (0.05 L/hr) and industrial worker (1 L/day).

A summary of the receptor-specific input values used to estimate chemical intakes from ingestion of groundwater are presented in Table 5-33.

5.2.3.5 Dermal Contact with Groundwater

Hypothetical future residential receptors were assumed to use groundwater for domestic purposes (e.g., bathing, showering, and dish washing) that can result in dermal exposure. Short-term dermal exposure was assumed to occur for the construction worker during excavation activities. Also future industrial could have contact with groundwater if groundwater was used as a potable water supply at the site. The following equation was used to assess exposures resulting from dermal contact with groundwater (USEPA, July 2004):

$$DAD = \frac{(DA_{\text{event}})(EV)(ED)(EF)(SA)}{(BW)(AT)}$$

where:

DAD	=	dermally absorbed dose of chemical from water (mg/kg/day)
DA _{event}	=	dermally absorbed dose per event (mg/cm ² -event)
EV	=	event frequency (events/day)
ED	=	exposure duration (yr)
EF	=	exposure frequency (days/yr)
SA	=	skin surface area available for contact (cm ²)
BW	=	body weight (kg)
AT	=	averaging time (days); for non-carcinogens, AT = ED x 365 days/yr

for carcinogens, AT = 70 yrs x 365 days/yr

Most of the exposure assumptions used to estimate chemical intakes from dermal contact with groundwater were based on default assumptions described in standard USEPA guidance and are summarized in Table 5-33.

Dermal intakes for residents assumed total body exposure on a daily basis. For construction workers the exposed surface area of the body available for contact was based on assumed activities and was similar to the assumptions outlined for dermal contact with soil. It is assumed industrial workers only wash their hands and do not bathe or shower while at work. A value of 904 cm (assume hands are exposed) was used for the skin area available for contact by industrial workers.

The absorbed dose per event (DA_{event}) was estimated using a non-steady-state approach for organic compounds and a traditional steady-state approach for inorganics. For organics, the following equations apply:

$$\text{If } t_{event} < t^*, \text{ then: } DA_{event} = (2)(K_p)(FA)(C_w)(CF) \left(\sqrt{\frac{6 \tau t_{event}}{\pi}} \right)$$

$$\text{If } t_{event} > t^*, \text{ then: } DA_{event} = (K_p)(FA)(C_w)(CF) \left(\frac{t_{event}}{1+B} + 2 \tau \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right)$$

where:

t_{event}	=	duration of event (hour/event)
t^*	=	time to reach steady-state conditions (hour)
K_p	=	permeability coefficient from water through skin (cm/hour)
FA	=	chemical-specific fraction absorbed (dimensionless)
C_w	=	concentration of chemical in water (mg/L)
τ	=	lag time (hour)
π	=	Pi (dimensionless; equal to 3.1416)
CF	=	conversion factor (0.001 L/cm ³)
B	=	Dimensionless ratio of the permeability of the stratum corneum relative to the permeability across the viable epidermis (dimensionless)

Values for the chemical-specific parameters (t^* , K_p , FA, τ , and B) were obtained from the current dermal guidance (USEPA, July 2004, Exhibit B-3) and are presented in Table 5-34. If published values were not available for a particular compound, they were calculated using equations provided in the USEPA dermal guidance. While the dermal guidance provides chemical specific values for PAHs the guidance also recommends that dermal absorption of PAHs in groundwater not be evaluated quantitatively in a HHRA

because such evaluations are outside of the effective predictive domain of the model. Therefore, no chemical-specific parameters are included in Table 5-34 for PAHs and dermal exposures to PAHs and in water were not evaluated in this HHRA.

The following steady-state equation was used to estimate DA_{event} for inorganics:

$$DA_{event} = (K_p)(C_w)(t_{event})$$

The dermal permeability coefficient (K_p) values recommended in the USEPA dermal guidance (USEPA, July 2004) were used to calculate DA_{event} for inorganic COPCs.

5.2.3.6 Inhalation of Volatiles in Groundwater

Groundwater exposure may also result in chemical intake through inhalation if the water resource is used as a domestic water supply or is exposed during construction activities and VOCs are present in the groundwater. This exposure route is plausible for residential receptors who may be exposed while showering, bathing, washing dishes, etc. and for construction workers contacting shallow groundwater during excavation activities. Chemical intakes from inhalation exposure due to the volatilization of COPCs in groundwater were estimated in the following manner (USEPA, January 2009):

$$EC = \frac{(C_{air})(ET)(EF)(ED)}{AT \times 24 \text{ hrs / day}}$$

where:

EC	=	exposure concentration (mg/m ³)
C_{air}	=	concentration of chemical in air (mg/m ³)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
AT	=	averaging time (days)
	=	for non-carcinogens, AT = ED x 365 days/yr
	=	for carcinogens, AT = 70 yr x 365 days/yr

For hypothetical child and adult residents, the chemical concentration in air resulting from the volatilization of COPCs during domestic groundwater use is calculated by using the following equation (USEPA, March 1991):

$$C_{air} = (C_{gw})(K)$$

where:

C_{air}	=	chemical concentration in indoor air, mg/m ³
C_{gw}	=	chemical concentration in groundwater, mg/L
K	=	Volatilization Factor, L/m ³

The same exposure frequencies and exposure durations used to estimate intake for dermal contact with groundwater are used to evaluate chemical intakes for inhalation of VOCs from domestic use of groundwater.

Construction workers may be exposed to COPCs that have volatilized from groundwater when excavation exposes the shallow water table. The same exposure frequency and exposure time used to estimate intake from dermal contact with groundwater were used to evaluate intake from inhalation of VOCs from groundwater during construction activities.

There are no well-established models available for estimating migration of volatiles from groundwater into a construction/utility trench. To estimate EPCs for air in a construction trench, the HHRA used an approach suggested by the Virginia Department of Environmental Quality (VDEQ, September 2012) that is based on a combination of a vadose zone model (to estimate volatilization of gases from contaminated groundwater into a trench) and a box model (to estimate dispersion of the contaminants from the air inside the trench into the above-ground atmosphere). The VDEQ methodology is described in the following paragraphs.

The airborne concentration of a contaminant in a trench can be estimated using the following equation:

$$C_{air} = C_{GW} \times VF$$

where:

C_{air}	=	air concentration of contaminant in the trench (µg/m ³)
C_{GW}	=	concentration of contaminant in groundwater (µg/L)
VF	=	volatilization factor (L/m ³)

It was assumed that a construction project at the Site could result in an excavation of 15 ft bgs or less. If the depth to groundwater at a site is less than 15 feet, the VDEQ model assumes that a worker would encounter groundwater when digging an excavation or a trench. The worker would then have direct

exposure to the groundwater. The worker would also be exposed to contaminants in the air inside the trench that would result from volatilization from the groundwater pooling at the bottom of the trench.

The following equation was used to calculate the VF for a trench less than 15 ft deep:

$$VF = (K_i \times A \times F \times 10^{-3} \times 10^4 \times 3,600) / (ACH \times V)$$

where:

K_i	=	overall mass transfer coefficient of contaminant (cm/s)
A	=	area of the trench (m^2)
F	=	fraction of floor through which contaminant can enter (unitless)
ACH	=	air changes per hour (h^{-1}) = $360 h^{-1}$
V	=	volume of trench (m^3)
10^{-3}	=	conversion factor (L/cm^3)
10^4	=	conversion factor (cm^2/m^2)
$3,600$	=	conversion factor (seconds/hour)

Studies of urban canyons suggest that if the ratio of trench width, relative to wind direction, relative to trench depth is less than or equal to 1, a circulation cell or cells will be set up within the trench that limits the degree of gas exchange with the atmosphere and, based on measured ventilation rates of buildings, the air changes per hour (ACH) is assumed to be two. Based on the ratio of trench depth to average wind speed, if the ratio of trench width to trench depth is greater than 1, the air exchange between the trench and above-ground atmosphere is not restricted, and the ACH is assumed to be 360. The exposure assessment performed for this HHRA assumed that the width-to-trench depth ratio was greater than 1; therefore, the ACH was set at 360.

K_i was calculated using the following equation:

$$K_i = 1 / \{ (1/k_iL) + [(RT) / (H_i k_iG)] \}$$

where:

K_i	=	overall mass transfer coefficient of containment (cm/s)
k_iL	=	liquid-phase mass transfer coefficient of i (cm/s)
R	=	ideal gas constant ($atm \cdot m^3/mole \cdot ^\circ K$) = 8.2×10^{-5}
T	=	average system absolute temperature ($^\circ K$) (Default = $298^\circ K$)
H_i	=	Henry's Law constant of i ($atm \cdot m^3/mole$)
k_iG	=	gas-phase mass transfer coefficient of i (cm/s)

The formulas for calculating k_L and k_G are as follows:

$$k_L = (MWO_2/MW_i)^{0.5} \times (T/298) \times k_{L,O_2}$$

where:

k_L	=	liquid-phase mass transfer coefficient of component i (cm/s)
MWO_2	=	molecular weight of oxygen (g/mole)
MW_i	=	molecular weight of component i (g/mole)
k_{L,O_2}	=	liquid-phase mass transfer coefficient of oxygen at 25°C (cm/s) = 0002 cm/s

$$k_G = (MWH_2O/MW_i)^{0.335} \times (T/298)^{1.005} \times k_{G,H_2O}$$

where:

k_G	=	gas-phase mass transfer coefficient of component i (cm/s)
MWH_2O	=	molecular weight of water (g/mole)
k_{G,H_2O}	=	gas-phase mass transfer coefficient of water vapor at 25°C (cm/s)= 0.833 cm/s (USEPA, 1988).

Chemical properties were obtained from the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (USEPA, December 2002) and are presented in Table 5-35.

5.2.3.7 Assessing Cancer Risks from Early Life Exposures

USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, March 2005) recommends making adjustments to the toxicity of carcinogenic chemicals that act via the mutagenic mode of action when evaluating early-life exposures. The guidance recommends using age-dependent adjustment factors (ADAFs) combined with age-specific exposure estimates when assessing cancer risks. In the absence of chemical-specific data, the supplement guidance recommends the following default adjustments, which reflect the fact that cancer risks are generally higher from early-life exposures than from similar exposures later in life:

- For exposures before 2 years of age (i.e., spanning a 2-year interval from the first day of birth until a child's second birthday), a 10-fold adjustment.
- For exposures between 2 and 16 years of age (i.e., spanning a 14-year time interval from a child's second birthday until their sixteenth birthday), a three-fold adjustment.
- For exposures after turning 16 years of age, no adjustment.

The adjustments were applied using the same method as that used by ORNL in the development of RSLs. Children were evaluated as two age groups, ages 0 to 2 years and ages 2 to 6 years, and adults were evaluated as two age groups, ages 6 to 16, and ages greater than 16 years old. Using this approach, the intakes for hypothetical residents were calculated as follows:

$$\text{Intake}_{\text{Child}} = \text{Intake}_{(\text{ages } 0 - 2 \text{ years})} \times 10 + \text{Intake}_{(\text{ages } 2 - 6 \text{ years})} \times 3$$
$$\text{Intake}_{\text{Adult}} = \text{Intake}_{(\text{ages } 6 - 16 \text{ years})} \times 3 + \text{Intake}_{(\text{ages } > 16 \text{ years})}$$

And the intakes for adolescent trespassers were calculated as follows:

$$\text{Intake}_{\text{Adolescent}} = \text{Intake}_{(\text{age } 6 - 16 \text{ years})} \times 3$$

The above approach was used only for those chemicals that are identified as mutagenic in the ORNL screening table (e.g., carcinogenic PAHs, hexavalent chromium). Sample calculations showing how this approach was applied are included in Appendix F.4.

5.2.3.8 Summary of Exposure Parameters

A summary of exposure input parameters for all exposure pathways is presented in Table 5-33 for the identified potential receptor groups at the Site. In general, standard default parameters (e.g., USEPA, December 1989, March 1991, July 1997, and July 2004; RIDEM, November 2011), which combine mid-range and upper-end exposure factors, were used in this HHRA.

5.3 TOXICITY ASSESSMENT

The toxicity assessment weighs the evidence regarding the potential for exposure to chemicals to produce adverse effects in exposed receptors and, when possible, the assessment estimates the relationship between the exposure to a chemical and the increased likelihood and/or severity of adverse effects. Quantitative estimates of the relationship between the magnitude and type of exposures and the severity or probability of human health effects are defined for the identified constituents of concern. Quantitative toxicity values determined during this component of the risk assessment are integrated with exposure assessment outputs to characterize the potential occurrence of adverse health effects for each receptor group.

The reference dose (RfD) is the toxicity value used to evaluate noncarcinogenic health effects for ingestion and dermal exposures. The reference concentration (RfC) is used to evaluate noncarcinogenic

health effects for inhalation exposures. The RfD and RfC estimate a daily exposure level for a human population that is unlikely to pose an appreciable risk during a portion or for all of a human lifetime. It is based on a review of animal and/or human toxicity data, with adjustments for various data uncertainties. Carcinogenic effects are quantified using the cancer slope factor (CSF) for ingestion and dermal exposures, and using inhalation unit risks (IUR) for inhalation exposure that are plausible upper-bound estimates of the probability of the development of cancer per unit intake of the chemical over a lifetime. These are typically based on dose-response data from human and/or animal studies.

5.3.1 Toxicity Criteria for Oral and Inhalation Exposures

Oral RfDs and CSFs and inhalation RfCs and IURs used in this HHRA were obtained from the following primary USEPA literature sources (December 2003):

- Tier 1 - Integrated Risk Information System (IRIS).
- Tier 2 - USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical-specific basis when requested by USEPA's Superfund program.
- Tier 3 - Other Toxicity Values – These sources include but are not limited to California Environmental Protection Agency (Cal EPA) toxicity values, Agency for Toxic Substances and Disease Registry (ATSDR) values, and the Annual Health Effects Assessment Summary Tables (HEAST) (USEPA, July 1997).

Although toxicity criteria can be found in several toxicological sources, USEPA's IRIS online database is the preferred source of toxicity values. This database is continuously updated, and the presented values have been verified by USEPA. The toxicity criteria for the constituents selected as COPCs are presented in Tables 5-36 through 5-39.

5.3.2 Toxicity Criteria for Dermal Exposure

RfDs and CSFs in the scientific literature are typically expressed as “administered” (i.e., not absorbed) doses. Therefore, these values are considered inappropriate for estimating risks associated with dermal exposures. Oral dose response parameters based on administered doses must be adjusted to absorbed doses before they can be compared to estimated dermal exposure intakes.

When oral absorption is essentially complete (i.e., 100 percent), an absorbed dose is equivalent to the administered dose, and therefore no toxicity adjustment is necessary. Conversely, when the gastrointestinal absorption of a chemical is poor (e.g., 1 percent), the absorbed dose is smaller than the administered dose; thus, toxicity factors based on absorbed dose should be adjusted to account for the difference in the absorbed dose relative to the administered dose. USEPA (July 2004) recommends a 50 percent absorption cut-off to reflect the intrinsic variability in analyzing absorption studies. Therefore, the adjustment from administered to absorbed dose was only performed when the chemical specific gastrointestinal absorption efficiency was less than 50 percent. The adjustment from administered to absorbed dose was made using chemical specific gastrointestinal absorption efficiencies published in numerous sources of guidance (e.g., USEPA 2004 [the primary reference], IRIS, ATSDR toxicological profiles, etc.), using the following equations:

$$\begin{aligned} \text{RfD}_{\text{dermal}} &= (\text{RfD}_{\text{oral}}) (\text{ABS}_{\text{GI}}) \\ \text{CSF}_{\text{dermal}} &= (\text{CSF}_{\text{oral}}) / (\text{ABS}_{\text{GI}}) \end{aligned}$$

where: ABS_{GI}	=	absorption efficiency in the gastrointestinal tract
$\text{RfD}_{\text{dermal}}$	=	RfD for the dermal route of exposure
RfD_{oral}	=	RfD for the oral route of exposure
$\text{CSF}_{\text{dermal}}$	=	CSF for the dermal route of exposure
CSF_{oral}	=	CSF of the oral route of exposure

As noted above, the preceding adjustment of the oral toxicity criteria (e.g., RfDs, CSFs) was necessary to allow quantitative evaluation of the dermal route of exposure in the baseline risk assessment. An explanation of this procedure and the need for this procedure are presented in Appendix A of USEPA RAGS Part A.

5.3.3 Toxicity of Chromium

Toxicity criteria are available for different forms of chromium, which is considered to be more toxic in the hexavalent state. Because there is no evidence to support the conclusion that hexavalent chromium is present at the site, speciation analyses were not completed for samples collected at the Site. However, risks associated with this chemical were assessed by conservatively assuming that 100 percent of the reported total chromium result is attributable to hexavalent chromium.

5.3.4 Toxicity of PCBs

The HHRA of PCBs was conducted per the following USEPA guidance document: PCBs: Cancer Dose-Response Assessment and Application to Environmental Mixtures (USEPA, September 1996).

This guidance presents a tiered approach to the risk assessment of PCBs. A range of CSFs for PCBs is presented for use in HHRA according to criteria that consider the environmental media investigated, type of exposure, and anticipated persistence, bioaccumulation potential, and toxicity of the PCB homologues/congeners detected in the samples.

5.3.5 Toxicity Criteria for the Carcinogenic Effect of PAHs

Limited toxicity values are available to evaluate the carcinogenic effects from exposure to PAHs. The most extensively studied PAH is benzo(a)pyrene, which is classified by the USEPA as a probable human carcinogen. Although CSFs are available for benzo(a)pyrene, insufficient data are available to calculate CSFs for other potentially carcinogenic PAHs. Toxic effects for these chemicals were evaluated using the toxicity equivalent factors (TEFs) that relate the potency of the other potentially carcinogenic PAHs to the potency of benzo(a)pyrene, as presented in current USEPA guidance (USEPA, July 1993). The equivalent oral CSF for a carcinogenic PAH other than benzo(a)pyrene is derived by multiplying the CSF for benzo(a)pyrene by TEF recommended for that PAH. TEFs for the individual carcinogenic PAHs are as follows:

<u>Compound</u>	<u>TEF</u>
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1
Indeno(1,2,3-cd)pyrene	0.1

Carcinogenic PAHs acts via a mutagenic mode of action. USEPA Guidelines for Carcinogen Risk Assessment (2005a) and Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005b) specify the use of ADAFs for carcinogens that act via a mutagenic mode of action. No chemical-specific ADAF is available for carcinogenic PAHs; therefore, USEPA's default ADAFs are

applied to the carcinogenic intakes for the carcinogenic PAHs. The following default ADAFs were applied: 10 for ages 0 to 2, 3 for ages 2 to 16, and 1 (no adjustment) for ages 16 to 70.

5.3.6 Toxicity Criteria for Trichloroethene

The toxicity factors for TCE were finalized by USEPA in September 2011. TCE has toxicity factors that address both carcinogenic and noncarcinogenic effects. Toxicological studies indicated that exposure to TCE increases the risk of kidney cancer, liver cancer, and non-Hodgkin's lymphoma. There is a sufficient weight of evidence to suggest that TCE-induced kidney tumors are a result of a mutagenic mode of action. USEPA Guidelines for Carcinogen Risk Assessment (2005a) and Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005b) specify the use of ADAFs for carcinogens that act via a mutagenic mode of action. However, the ADAFs will only be applied to a portion of the cancer slope factor and inhalation unit risk that is attributable to kidney-induced tumors.

The oral CSF for TCE is $4.6 \times 10^{-2} \text{ (mg/kg-day)}^{-1}$ and the IUR is $4.1 \times 10^{-6} \text{ (}\mu\text{g/m}^3\text{)}^{-1}$. For the kidney mutagenic endpoint, the oral CSF is $9.3 \times 10^{-3} \text{ (mg/kg-day)}^{-1}$ and the IUR is $1 \times 10^{-6} \text{ (}\mu\text{g/m}^3\text{)}^{-1}$. There are no chemical-specific ADAFs for the kidney mutagenic endpoint; therefore, the USEPA's default ADAFs are applied to the carcinogenic toxicity factors for the kidney-related component of TCE's carcinogenic toxicity factors. The following default ADAFs should be applied: 10 for ages 0 to 2, 3 for ages 2 to 16, and 1 (no adjustment) for ages 16 to 70. For the liver cancer and non-Hodgkin's lymphoma endpoints, the oral CSF is $3.7 \times 10^{-2} \text{ (mg/kg-day)}^{-1}$ and the IUR is $3 \times 10^{-6} \text{ (}\mu\text{g/m}^3\text{)}^{-1}$. No ADAFs are applied to these values.

Noncarcinogenic effects are evaluated like all noncarcinogens in accordance with USEPA's risk assessment guidance (1989).

5.4 RISK CHARACTERIZATION

This section provides a characterization of human health risks associated with potential exposures to COPCs at the Site. Potential risks (non-carcinogenic and carcinogenic) for human receptors resulting from exposures outlined in the exposure assessment were quantitatively determined and are discussed in this section. Sections 5.4.1 and 5.4.2 outline the methods used to quantitatively estimate the type and magnitude of potential risks for human receptors. Summaries of the risk characterization for the North Waterfront, Central Shipyard, Building 234, South Waterfront, and PCB Removal area are provided in Section 5.4.3.

5.4.1 Quantitative Analysis of Chemicals

Quantitative estimates of risk for chemicals were calculated according to risk assessment methods outlined in USEPA guidance (USEPA, December 1989). Lifetime cancer risks are expressed in the form of dimensionless probabilities, referred to as ILCRs, based on CSFs and IURs. Non-carcinogenic risk estimates are presented in the form of HQs that are determined through a comparison of intakes with published RfDs and RfCs.

ILCR estimates for ingestion and dermal exposures were generated for each COPC using estimated exposure intakes and published CSFs, as follows:

$$\text{ILCR} = (\text{Estimated Exposure Intake})(\text{CSF})$$

ILCRs estimates for inhalation exposures were generated for each COPC using estimated exposure concentrations and published IURs, as follows:

$$\text{ILCR} = (\text{IUR})(\text{Exposure Concentration})(1000 \mu\text{g}/\text{mg})$$

An ILCR of 1×10^{-6} indicates that the exposed receptor has an one-in-one-million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million people.

Non-carcinogenic risks were assessed using the concept of HQs and HIs. The HQ for a COPC is the ratio of the estimated intake to the RfD and is calculated for ingestion and dermal exposures as follows:

$$\text{HQ} = (\text{Estimated Exposure Intake})/(\text{RfD})$$

For inhalation exposures, HQ is calculated as follows:

$$\text{HQ} = (\text{Exposure Concentration})/(\text{RfC})$$

An HI was generated by summing the individual HQs for all COPCs. The HI is not a mathematical prediction of the severity of toxic effects and therefore is not a true "risk"; it is simply a numerical indicator of the possibility of the occurrence of noncarcinogenic (threshold) effects.

5.4.2 Interpretation of Risk Assessment Results

To interpret the quantitative risk estimates and to aid risk managers in determining the need for remediation, quantitative risk estimates were compared to typical USEPA risk benchmarks. Calculated ILCRs were interpreted using USEPA's target cancer risk range (1×10^{-4} to 1×10^{-6}) and RIDEM's cumulative cancer benchmark of 1×10^{-5} . HIs were evaluated against a benchmark value of 1.

USEPA defines the range of 1×10^{-4} to 1×10^{-6} as the ILCR target range for hazardous waste facilities addressed under the CERCLA and the Resource Conservation Recovery Act (RCRA). Individual or cumulative ILCRs greater than 1×10^{-4} are generally considered "unacceptable" by USEPA. Risk management decisions are necessary when the ILCR is within 1×10^{-4} to 1×10^{-6} . USEPA typically does not require remediation when the cumulative ILCR is less than 1×10^{-6} . Similarly, cumulative ILCRs greater than 1×10^{-5} are generally considered to be "unacceptable" by the State of Rhode Island; remediation may or may not be necessary when the cumulative ILCR exceeds 1×10^{-5} .

A HI exceeding unity (1.0) indicates that there may be non-carcinogenic health risks associated with exposure. If a HI exceeds unity, target organ effects associated with exposure to COPCs are considered. Only those HQs for chemicals that affect the same target organ(s) or exhibit similar critical effect(s) are regarded as truly additive. Consequently, it may be possible for the cumulative HI to exceed 1.0, but no adverse health effects are anticipated if the COPCs do not affect the same target organ or exhibit the same critical effect (i.e., target-organ/critical effect-specific HIs do not exceed 1).

5.4.3 Results of the Risk Characterization

This section contains a summary of the results of the risk characterization for the North Waterfront, Central Shipyard, South Waterfront, former Building 234, and PCB removal area. Quantitative risk estimates for potential human receptors were developed for those chemicals identified as COPCs. The methodology used to calculate the risks presented in this section was discussed in Sections 5.2 and 5.3. Potential risks from direct contact exposures to surface soil, subsurface soil, and groundwater are discussed in Sections 5.4.4.1 through 5.4.4.10. Uncertainties associated with the risk estimates are discussed in Section 5.5.

Potential cancer risks and hazard indices were calculated for current/future adolescent and adult trespassers, current/future construction workers, current/future industrial workers, and hypothetical future child and adult residents and are summarized in Tables 5-40 through 5-44. Chemicals retained as COCs

are summarized in Tables 5-45 and 5-49. Sample calculations are presented in Appendix F.4, and the results of the risk assessment in RAGS Part D format are included in Appendix F.2.

5.4.3.1 Non-Carcinogenic Risks – North Waterfront

Table 5-40 presents the HIs for exposures to surface soil, subsurface soil, and groundwater at the North Waterfront. Cumulative HIs (developed on a target-organ/effect specific basis) for all receptors under current and future scenarios were less than or equal to unity (1) with the exception of hypothetical child and adult residents. The HIs of 6 for hypothetical child residents and 4 for hypothetical adult residents for exposures to groundwater exceeded the acceptable level of 1. TCE was the major contributor to the hazard index.

5.4.3.2 Carcinogenic Risks – North Waterfront

Table 5-40 presents the ILCRs for the North Waterfront. Cumulative ILCRs for all receptors were within the USEPA's target risk range of 10^{-4} to 10^{-6} with the exception of those for the hypothetical child and lifelong residents. The ILCR of 2×10^{-4} for hypothetical child residents and 2×10^{-4} for hypothetical lifelong residents exposed to surface soil and groundwater exceeds USEPA's target risk range. However the ILCRs for hypothetical child (ICLR = 6×10^{-5}) and lifelong residents (ICLR = 7×10^{-5}) exposed to surface soil were within USEPA's target risk range. The ILCRs of 1×10^{-4} for hypothetical child and lifelong residents exposed to groundwater were equal to the upper bound of USEPA's target risk range.

Cumulative ILCRs for all receptors with the exception of hypothetical child, adult, and lifelong residents were less than RIDEM's cumulative cancer risk benchmark of 1×10^{-5} . The ILCRs for hypothetical child residents exposed to surface soil, subsurface soil, and groundwater exceeded the RIDEM benchmark. The ILCR for hypothetical adult residents exposed to groundwater and hypothetical lifelong residents exposed to surface soil, subsurface soil, and groundwater exceeded RIDEM's cumulative cancer risk benchmark. Carcinogenic PAHs and arsenic were the major contributors to the ILCRs for exposure to surface soil and subsurface soil. TCE, vinyl chloride, and chromium were the major contributors to the ILCRs for groundwater.

5.4.3.3 Non-Carcinogenic Risks – Central Shipyard

Table 5-41 presents the HIs for exposures to surface soil, subsurface soil, and groundwater at the Central Shipyard. Cumulative HIs for current and future adolescent and adult trespassers and current industrial workers were less than unity (1). HIs for current/future construction workers, future industrial workers and

hypothetical child and adult residents exposed to surface soil and subsurface soil were less than unity. HIs for hypothetical child residents exposed to surface soil and subsurface soil were 3 and 2 respectively, although as show below, the HIs for the individual target organs were all less than or equal to 1.

Hypothetical Child Residents		
Target Organ	Hazard Quotient	
	Surface Soil	Subsurface Soil
Central Nervous System	0.2	0.1
Cardiovascular System	1	0.9
Gastrointestinal System	0.6	0.5
Respiratory System	0.0002	0.0002
None Reported	0.07	0.06
Skin	1	0.9
Thyroid	0.6	0.5

The HI for construction workers exposed to groundwater was 2, although as show below, the HIs for the individual target organs were all less than or equal to 1.

Future Construction Workers	
Target Organ	Hazard Quotient
Central Nervous System	1
Cardiovascular System	0.1
Gastrointestinal System	0.04
Skin	0.1
Thyroid	0.003
Kidney	0.009

HIs for future industrial workers, hypothetical child residents, and hypothetical adult residents exposed to groundwater were 7, 56, and 24, respectively. Arsenic (HI = 3) and manganese (HI = 4) were the major contributors to the HI for industrial workers exposed to groundwater. Arsenic, (HI = 17), cobalt (HI = 5), iron (HI = 6), and manganese (HI = 28) were the major contributors to the HI for hypothetical child residents exposed to groundwater. Arsenic (HI = 7), cobalt (HI = 2), iron (HI = 3), and manganese (HI = 12) were also the major contributors to the HI for hypothetical adult residents exposed to groundwater.

5.4.3.4 Carcinogenic Risks – Central Shipyard

Table 5-41 presents the ILCRs for the Central Shipyard. Cumulative ILCRs for all receptors were within the USEPA's target risk range of 10^{-4} to 10^{-6} with the exception of those for the future industrial workers and hypothetical child, adult and lifelong residents. However the ILCRs for future industrial workers and hypothetical adult residents exposed to surface soil and subsurface soil and hypothetical child residents exposed to subsurface soil were within USEPA's target risk range. The ILCR of 1×10^{-4} for hypothetical child residents exposed to surface soil and hypothetical lifelong residents exposed to surface soil and subsurface soil was equal to the upper bound of USEPA's target risk range. The ILCRs for exposures to groundwater by future industrial workers (ILCR = 4×10^{-4}), hypothetical child residents (ILCR = 6×10^{-4}), hypothetical adult residents (ILCR = 1×10^{-3}), and hypothetical lifelong residents (ILCR = 2×10^{-3}) exceed USEPA's target risk range. Arsenic was the major contributors to the ILCRs for groundwater.

Cumulative ILCRs for current and future adolescent, adult, and lifelong trespassers, and current/future construction workers were less than RIDEM's cumulative cancer risk benchmark of 1×10^{-5} . The ILCRs for current industrial workers exposed to surface soil, and future industrial workers, hypothetical child, adult, and lifelong residents exposed to surface soil, subsurface soil, and groundwater exceeded the RIDEM benchmark. Arsenic and chromium was the major contributor to the ILCRs for current and future industrial workers exposed to surface soil. Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for hypothetical child, adult, and lifelong residents exposed to surface soil and subsurface soil. Arsenic was the major contributors to the ILCRs for groundwater.

5.4.3.5 Non-Carcinogenic Risks – Former Building 234

Table 5-42 presents the HIs for exposures to surface soil, subsurface soil, and groundwater at former Building 234. Cumulative HIs for current and future adolescent trespassers, adult trespassers, industrial workers, and hypothetical adult residents were less than unity (1). HIs for construction workers exposed to surface soil and subsurface soil were 2 and 2 respectively, although as show below, the HIs for the individual target organs were all less than or equal to 1.

Future Construction Workers	
Target Organ	Hazard Quotient
Central Nervous System	1
Cardiovascular System	0.3
Gastrointestinal System	0.08
None Specified	0.002

Future Construction Workers	
Target Organ	Hazard Quotient
Skin	0.3
Thyroid	0.007

HIs for hypothetical child residents exposed to surface soil and subsurface soil were 3 and 3 respectively, although as shown below, the HIs for the individual target organs were all less than or equal to 1.

Hypothetical Child Residents		
Target Organ	Hazard Quotient	
	Surface Soil	Subsurface Soil
Central Nervous System	0.3	0.5
Cardiovascular System	0.8	1
Gastrointestinal System	0.6	0.6
Kidney	0.4	0
Respiratory System	0.0004	0.0002
None Reported	0.4	0.1
Skin	0.8	1
Thyroid	0.8	0.6

The HI for hypothetical child residents exposed to groundwater was 4. Manganese (HQ = 2) was the major contributor to the HI.

The HI for hypothetical adult residents exposed to groundwater was 2, although as shown below, the HIs for the individual target organs were all less than or equal to 1.

Hypothetical Adult Residents	
Target Organ	Hazard Quotient
Central Nervous System	0.7
Cardiovascular System	1
Developmental	0.2
Gastrointestinal System	0.02
Kidney	1
Liver	0.9
Skin	0.1
Thyroid	0.2

5.4.3.6 Carcinogenic Risks – Former Building 234

Table 5-42 presents the ILCRs for the former Building 234. Cumulative ILCRs for all receptors were within the USEPA's target risk range of 10^{-4} to 10^{-6} with the exception of those for hypothetical child and lifelong residents. The ILCR of 1×10^{-4} for hypothetical child and lifelong residents exposed to subsurface soil was equal to the upper bound of USEPA's target risk range. The ILCRs of 3×10^{-4} for hypothetical child residents and 4×10^{-4} for hypothetical lifelong residents exposed to surface soil exceeds USEPA's target risk range. Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for surface soil.

Cumulative ILCRs for current and future adolescent, adult, and lifelong trespassers and current/future construction workers were less than or equal to RIDEM's cumulative cancer risk benchmark of 1×10^{-5} . The ILCRs for current industrial workers exposed to surface soil and future industrial workers exposed to surface soil and subsurface soil exceeded the RIDEM benchmark. The ILCRs for hypothetical child, adult, and lifelong residents exposed to surface soil, subsurface soil, and groundwater exceeded the RIDEM benchmark. Arsenic and chromium were the major contributors to the ILCRs for current and future industrial workers exposed to surface soil and subsurface soil. Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for hypothetical child, adults, and lifelong residents exposed to surface soil and subsurface soil. TCE, vinyl chloride, and arsenic were the major contributors to the ILCRs for hypothetical child, adult, and lifelong residents exposed to groundwater.

5.4.3.7 Non-Carcinogenic Risks – South Waterfront

There are no surface soil or groundwater samples available for the South Waterfront; therefore only exposures to subsurface soils were evaluated. Receptors under current land use are only exposed to surface soil; consequently no HIs or ILCRs were calculated for these receptors at the South Waterfront. Table 5-43 presents the HIs for exposures to subsurface soil at the South Waterfront. Cumulative HIs for all receptors were less than unity (1) with the exception of the hypothetical child resident. The HI for hypothetical child residents exposed to subsurface soil was 3, although as shown below, the HIs for the individual target organs were all less than or equal to 1.

Hypothetical Child Residents	
Target Organ	Hazard Quotient
Central Nervous System	0.2
Cardiovascular System	1
Gastrointestinal System	0.8

Hypothetical Child Residents	
Target Organ	Hazard Quotient
Respiratory System	0.0004
None Reported	0.08
Skin	1
Thyroid	1

5.4.3.8 Carcinogenic Risks – South Waterfront

Table 5-43 presents the ILCRs for the South Waterfront. Cumulative ILCRs for all receptors were within the USEPA's target risk range of 10^{-4} to 10^{-6} with the exception of those for the hypothetical child and lifelong residents. The ILCR of 1×10^{-4} for hypothetical child and lifelong residents exposed to subsurface soil were equal to the upper bound of USEPA's target risk range.

Cumulative ILCRs for future adolescent, adult, and lifelong trespassers, and current/future construction workers were less than RIDEM's cumulative cancer risk benchmark of 1×10^{-5} . ILCRs for future industrial workers, hypothetical child, adult, and lifelong residents exceeded the RIDEM benchmark. Arsenic and chromium were the major contributor to the ILCRs for exposures to subsurface soil.

5.4.3.9 Non-Carcinogenic Risks – PCB Removal Area

Table 5-44 presents the HIs for exposures to surface soil and subsurface soil at the PCB removal area. No groundwater samples were collected for the PCB removal area; consequently HIs and ILCRs were not calculated for exposures to groundwater at the PCB removal area. Cumulative HIs for all receptors with the exception of current/future construction workers and hypothetical child residents were less than unity (1). The HI for current/future construction workers exposed to subsurface soil was 2, although as shown below, the HIs for the individual target organs were all less than or equal to 1.

Future Construction Workers	
Target Organ	Hazard Quotient
Central Nervous System	1
Cardiovascular System	0.4
Gastrointestinal System	0.2
Kidney	0.0002
Respiratory System	0.2

Future Construction Workers	
Target Organ	Hazard Quotient
Skin	0.6
Thyroid	0.02

The HI for construction workers exposed to surface soil was 1.

The HI for hypothetical child residents exposed to surface soil was 3, although as shown below, the HIs for the individual target organs were all less than or equal to 1.

Hypothetical Child Residents	
Target Organ	Hazard Quotient
Central Nervous System	0.3
Cardiovascular System	1
Gastrointestinal System	0.6
Kidney	0.001
Respiratory System	0.0003
Skin	1
Thyroid	1

The HI for hypothetical child residents exposed to subsurface soil was 4. Arsenic (HQ = 2) was the major contributors to the HI.

5.4.3.10 Carcinogenic Risks – PCB Removal Area

Table 5-44 presents the ILCRs for the PCB removal area. Cumulative ILCRs for all receptors were within the USEPA's target risk range of 10^{-4} to 10^{-6} with the exception of those for the hypothetical child and lifelong residents. The ILCR of 1×10^{-4} for hypothetical child exposed to subsurface soil was equal to the upper bound of USEPA's target risk range. The ILCR's for hypothetical child residents exposed to surface soil (ILCR = 5×10^{-4}), and hypothetical lifelong residents exposed to surface soil (ILCR = 5×10^{-4}) and subsurface soil (ILCR = 2×10^{-4}) exceeded USEPA's target risk range. Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for the hypothetical child and lifelong residents.

ILCRs for current adolescent, adult, and lifelong trespassers, future adult trespassers, and construction workers were less than RIDEM's cumulative cancer risk benchmark of 1×10^{-5} . ILCRs for future adolescent and lifelong trespassers exposed to surface soil, future industrial workers and hypothetical

child, adult, and lifelong residents exposed to surface soil and subsurface soil exceed RIDEM's cumulative cancer risk benchmark. Carcinogenic PAHs and Arsenic were the major contributors to the ILCRs for exposures to surface soil. Arsenic and chromium were the major contributors to the ILCRs for future industrial workers exposed to subsurface soil. Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for hypothetical child, adult, and lifelong residents exposed to subsurface soil.

5.4.3.11 Lead Risks

Lead was identified as a COPC in surface soil at Building 234. The maximum detected concentration in surface soil (189 J mg/kg) slightly exceeded the RIDEM residential DEC of 150 mg/kg but was less than OSWER soil screening level of 400 mg/kg for residential land use. Concentrations of lead only exceeded the RIDEM residential DEC in one sample. The 95% UCL of 115 mg/kg for lead is less than RIDEM residential DEC. Consequently, no adverse health effects are anticipated from residential exposures to lead in surface soil at Building 234.

5.4.3.12 Vapor Intrusion Risks

As discussed in Section 5.1.3 several VOCs were detected in groundwater and soil gas samples from the North Waterfront and groundwater samples at Building 234 at concentrations exceeding USEPA screening levels for VOC migration from groundwater through building foundations and into interior air. At present, there are no buildings at the North Waterfront or at former Building 234; consequently, the vapor intrusion exposure pathway is incomplete for current land use. It is possible that a building may be constructed on these areas in the future, but without knowing the details of the buildings there would be significant uncertainty associated with performing a quantitative evaluation of these areas using USEPA's Johnson and Ettinger volatilization model (2004). Instead, a semi-quantitative evaluation was conducted using USEPA's VISL Calculator (USEPA, May 2012).

The VISL Calculator is a spreadsheet tool that provides screening-level concentrations for groundwater and soil gas for default target risk levels and exposure scenarios. The VISL Calculator can assist remedial project managers in determining whether the vapor intrusion pathway has the potential to pose an unacceptable level of risk to human health by comparing subsurface and indoor air data against screening levels in the calculator.

The VISLs are calculated using the recommended approaches in existing USEPA risk assessment guidance and are based on the current understanding of the vapor intrusion pathway. Target indoor air

concentrations are calculated according to the guidance provided in Risk Assessment Guidance for Superfund (Part F) (USEPA, January 2009), which supersedes the approach that was used in USEPA's November 2002 draft vapor intrusion guidance (USEPA, 2002). The screening levels for groundwater and soil gas are calculated from the target indoor air concentrations using empirically-based conservative "generic" attenuation factors that reflect worst-case conditions. The generic VISLs are based on default exposure parameters and factors that represent RME conditions for chronic exposures. The VISL Calculator incorporates the latest toxicity values in the USEPA's RSL table and is updated as new versions are released. Hence, the calculated indoor air concentrations derived in the VISL Calculator are combined with the toxicity factors to characterize the risk. The VISL Calculator output provides the basis for this semi-quantitative screening risk evaluation for indoor air.

North Waterfront

Concentrations of TCE and vinyl chloride in groundwater samples exceeded the screening criteria for vapor intrusion (Table 5-9). Vinyl chloride was only detected in 1 of 14 groundwater samples, and TCE was detected in 8 of 14 groundwater samples. The associated chlorinated hydrocarbons, tetrachloroethene and cis- and trans -1,2-dichloroethene, were also detected. The maximum detected concentrations of these chlorinated hydrocarbons were incorporated in the VISL calculator. The residential cumulative cancer risk was 3×10^{-5} , within USEPA's target risk range; however, the residential cumulative hazard index exceeded 1, primarily due to TCE. The industrial cumulative cancer risk was 4×10^{-6} , within USEPA's target risk range, and the industrial cumulative hazard index was 1. The risks are presented in Table 5-45 and the VISL output is in Appendix F.5.

Concentrations of 1,3-butadiene, acrylonitrile, benzene, and TCE in soil gas samples exceeded the screening criteria for vapor intrusion (Table 5-10). 1,3-Butadiene and acrylonitrile were not detected in any surface soil, subsurface soil, or groundwater sample collected at the North Waterfront. Benzene was not detected in any groundwater sample collected at the North Waterfront. Additional chlorinated hydrocarbons were also detected in the soil gas samples. Of those chlorinated hydrocarbons that were detected in soil gas, 1,1,1-trichloroethane and 1,1-dichloroethane were not detected in groundwater.

As with groundwater, the maximum detected soil gas concentrations were incorporated in the VISL calculator. The residential cumulative cancer risk was 5×10^{-5} , within USEPA's target risk range; however, the residential cumulative hazard index exceeded 1, primarily due to TCE. The industrial cumulative cancer risk was 9×10^{-6} , within USEPA's target risk range, and the industrial cumulative hazard index exceeded 1, primarily due to TCE and 1,3-butadiene. The soil gas COPCs, acrylonitrile, benzene, and 1,3-butadiene were not detected in groundwater and can generally be attributed to urban air pollution. If the risks only considered chlorinated hydrocarbons, the residential cumulative cancer risk was 3×10^{-5} ,

within USEPA's target risk range; however, the residential cumulative hazard index still exceeded one. The industrial cumulative cancer risk is 4×10^{-6} and the industrial cumulative hazard index is one. The risks are presented in Table 5-46 and the VISL output is in Appendix F.5.

Building 234

Concentrations of TCE and vinyl chloride exceeded the screening criteria in groundwater samples collected at former Building 234 (Table 5-22). TCE and vinyl chloride were detected at maximum concentrations of 4 µg/L and 100µg/L, respectively. The associated chlorinated hydrocarbons, 1,1-dichloroethene and cis-1,2-dichloroethene, were also detected. The maximum detected concentrations of these chlorinated hydrocarbons were incorporated in the VISL calculator. The residential cumulative cancer risk was 6×10^{-4} , greater than USEPA's target risk range, and the residential cumulative hazard index exceeded 1, primarily due to vinyl chloride. The industrial cumulative cancer risk was 4×10^{-5} , within USEPA's target risk range, and the industrial cumulative hazard index was less than one. The risks are presented in Table 5-47 and the VISL output is in Appendix F.6.

The basis for this vapor intrusion screening risk evaluation was the use of maximum detected concentrations of contaminants in soil gas and groundwater, default exposure assumptions for reasonable maximum exposure (RME) residential and industrial exposures, and conservative attenuation factors (0.1 for soil gas to indoor air and 0.001 for groundwater to indoor air). It is evident that risks associated with vapor intrusion should be less than what was predicted in this evaluation. Based on data collected at many Navy industrial buildings, soil gas to indoor air attenuation factors typically range between 0.001 and 0.0001, thus reducing the risks associated with soil gas by a factor of more than 100. This would clearly reduce residential risks at North Waterfront to less than USEPA's target risk range and target hazard index of 1. Nonetheless, to ensure protection of human health the vapor intrusion pathway will be considered in future building construction.

5.4.3.13 Risk Associated With Naturally Occurring Chemicals.

As discussed in Section 5.1.2.1, chemicals detected at maximum concentrations exceeding COPC screening levels but within naturally occurring concentrations were not retained as COPCs and were not evaluated in the risk assessment presented in Sections 5.4.3.1 through 5.4.3.10. Tables 5-48 through 5-52 present the cancer risks and hazard indices associated with these chemicals for the North Waterfront, Central Shipyard, Former Building 234, the South Waterfront, and the PCB Removal Area. RAGS Part D tables for these chemicals are presented in Appendix F.6. Also included in Tables 5-48 and 5-52 is a comparison of the cancer risks and HIs for exposures to surface soil and subsurface soil based on site-related COPCs.

HIIs were less than unity for exposures to chemicals present at background concentrations for all five areas. ILCRs for all receptors exposed to chemicals present at background concentrations were less or within the USEPA target cancer risk range at all five areas. ILCRs exceeded RIDEM's acceptable risk levels for exposures to surface soil by hypothetical lifelong residents at the North Waterfront and hypothetical child and lifelong residents at the PCB Removal area. Arsenic was the major contributor to the ILCR at the North Waterfront and chromium was the major contributor to the ILCR at the PCB Removal area.

5.5 UNCERTAINTY ANALYSIS

This section presents a summary of uncertainties inherent in the risk assessment and includes a discussion of how they may affect the quantitative risk estimates and conclusions of the risk analysis. The baseline HHRA for the Site was performed in accordance with current USEPA guidance; however, there are varying degrees of uncertainty associated with the baseline HHRA. The following sections discuss general uncertainties in risk assessment and uncertainties specific to the risk assessment for the Site.

Uncertainty in the selection of COPCs was related to the current status of the predictive databases; the grouping of samples; the numbers, types, and distributions of samples; data quality; and the procedures used to include or exclude constituents as COPCs. Uncertainty associated with the exposure assessment included the values used as input variables for a given intake route or scenario, the assumptions made to determine EPCs, and the predictions regarding future land use and population characteristics. Uncertainty in the toxicity assessment included the quality of the existing toxicity data needed to support dose-response relationships and the weight of evidence used to determine the carcinogenicity of COPCs. Uncertainty in risk characterization is associated with exposure to multiple chemicals and the cumulative uncertainty from combining conservative assumptions made in earlier steps of the risk assessment process.

Whereas there were various sources of random uncertainty and bias, the magnitude of bias and uncertainty and the direction of bias are influenced by the assumptions made throughout the risk assessment including selection of COPCs and selection of values for dose-response relationships. Throughout the entire risk assessment, assumptions that consider safety factors were made so that the final calculated risks were overestimated.

Generally, risk assessments include two types of uncertainty, measurement and informational uncertainty. Measurement uncertainty refers to the usual variance that accompanies scientific measurements. For

example, this type of uncertainty is associated with analytical data collected for the site. The risk assessment reflects the accumulated variances of the individual values used.

Informational uncertainty stems from inadequate availability of information needed to complete the toxicity and exposure assessments. Often, this gap is significant, such as the absence of information on the effects of human exposure to low doses of a chemical, the biological mechanism of action of a chemical, or the behavior of a chemical in soil.

After the risk assessment is complete, the results must be reviewed and evaluated to identify the type and magnitude of uncertainty involved. Reliance on results from a risk assessment without consideration of uncertainties, limitations, and assumptions inherent in the process can be misleading. For example, to account for uncertainties in the development of exposure assumptions, conservative estimates were made to ensure that the particular assumptions were protective of sensitive subpopulations or the maximum exposed individuals. If a number of conservative assumptions are combined in an exposure model, the resulting calculations can propagate the uncertainties associated with those assumptions, thereby producing a much larger uncertainty for the final results. This uncertainty is biased toward over predicting both carcinogenic and non-carcinogenic risks. Thus, both the results of the risk assessment and the uncertainties associated with those results must be considered when making risk-management decisions.

This interpretation of uncertainty is especially relevant when the risks exceed the point of departure for defining "acceptable" risk. For example, when risks calculated using a high degree of uncertainty are less than an acceptable risk level (i.e., 10^{-6}), the interpretation of no significant risk is typically straightforward. However, when risks calculated using a high degree of uncertainty exceed an acceptable risk level (i.e., 10^{-4}), a conclusion can be difficult unless uncertainty is considered.

5.5.1 Uncertainty in Selection of COPCs

The most significant issues related to uncertainty in COPC selection at the Site are the COPC screening levels used, the absence of screening levels for a few chemicals detected in site media, and the lack of background screening. A brief discussion of each of these issues is provided in this section.

COPC Screening Levels

The use of risk-based screening values based on conservative land-use scenarios (i.e., residential land use for soil and ingestion of tap water for groundwater) corresponding to ILCRs of 10^{-6} and HIs of 0.1

ensured that all the significant contributors to risk from the site were evaluated. The elimination of chemicals present at concentrations that correspond to ILCRs less than 10^{-6} and HIs less than 0.1 should not have affected the final conclusions of the risk assessment because those chemicals were not expected to cause a potential health concern at the detected concentrations.

Chemicals without Established Screening Levels

USEPA RSLs are currently not available for some constituents detected at the Site [e.g., acenaphthylene, benzo(g,h,i)perylene, phenanthrene, and alpha- and gamma-chlordane]. For COPC screening, acenaphthene was used as a surrogate for acenaphthylene, pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene, and chlordane was selected as a surrogate for alpha- and gamma-chlordane. Applying toxicity values for one compound to another compound increases the uncertainty in the risk assessment both in regard to the selection of COPCs and the calculated risks. The direction of the uncertainty is not known.

In addition there are no USEPA RSLs of RIDEM direct contact criteria available for carbazole, creosote, and di-n-octyl phthalate. Carbazole was detected in 1 of 7 surface soil samples at the Central Shipyard. At former Building 234 carbazole was detected in 2 of 8 surface soil samples and di-n-octyl phthalate was detected 1 of 8 in surface soil samples along with elevated concentrations of PAHs, which have been identified as COCs at former Building 234. Carbazole and di-n-octyl phthalate were not detected in subsurface soil at former Building 234. The lack of risk-based screening criteria for these chemicals increases the uncertainty in the risk assessment both in regard to the selection of COPCs and the calculated risks. Although the uncertainty does not impact the conclusions of this risk assessment since these chemicals were detected infrequently and at low concentrations or they were co-located with chemicals identified as major risk drivers. Samples that were analyzed for creosote were also analyzed for PAHs, which were retained as COPCs in some areas. Consequently, the absence of screening criteria does not introduce any significant uncertainty into the risk assessment.

Also there are no USEPA SSLs or RIDEM GA leachability criteria available for carbazole, creosote, di-n-octyl phthalate, dibutyltin, monobutyltin, tetrabutyltin, and tributyltin. These chemicals were not detected in groundwater samples collected at the Site indicating that carbazole, di-n-octyl phthalate, dibutyltin, monobutyltin, tetrabutyltin, and tributyltin in soil have not migrated to groundwater. Consequently, given the absence of detection of these compounds in groundwater, the HHRA conclusions are unlikely to be affected by the lack of screening levels for these chemicals. Samples that were analyzed for creosote were also analyzed for PAHs, which were identified as exceeding screening levels in some areas.

Consequently, the absence of screening criteria does not introduce any significant uncertainty into the risk assessment.

5.5.2 Uncertainty in the Exposure Assessment

Uncertainty in the exposure assessment arose because of the methods used to calculate EPCs, the determination of land-use conditions, the selection of receptors and scenarios, and the selection of exposure parameters. Each of these is discussed below.

Exposure Point Concentrations

Uncertainty is associated with the use of 95-percent UCLs on the mean concentration as EPCs. As a result of using 95-percent UCLs, the estimations of potential risk for the RME scenario were most likely overstated because UCLs represent the upper limit that potential receptors would be exposed to over the entire exposure period.

In cases where there were an insufficient number of samples to calculate an UCL or the UCL was greater than the maximum detected concentration, the maximum detected concentration was used as the EPC. Use of the maximum concentration tends to overestimate potential risks because receptors are assumed to be exposed continuously to the maximum concentration for the entire exposure period.

Dibenzo(a,h)anthracene was retained as a COC in surface soil at Former Building 234. Dibenzo(a,h)anthracene was detected in only 1 of 7 surface soil samples, consequently the maximum detected concentration was used as the exposure point concentration. Although the use of the maximum detected concentration as the EPC overestimates the risks associated with exposures to dibenzo(a,h)anthracene, the conclusions of the HHRA are not effect because several other carcinogenic PAHs was also retained as COCs for surface soil at Former Building 234. Carcinogenic PAHs were retained as COCs for surface soil at the PCB Removal Area. There were only four surface soils samples available for this area; therefore the maximum detected concentration was used as the EPC for carcinogenic PAHs in surface soil at the PCB Removal Area. Concentrations of carcinogenic PAHs were only elevated in one surface soil sample. Concentrations of carcinogenic PAHs in the other surface soil samples are approximately 30 times lower than the maximum detected concentrations. Consequently the use of the maximum detected concentrations likely overestimates the risks calculated for exposures to carcinogenic PAHs in surface soil at the PCB Removal Area.

The maximum detected concentration was also used as the EPC for groundwater at the North Waterfront, Central Shipyard, and Former Building 234. The use of the maximum detected concentration as the EPC in groundwater is overly conservative because the maximum detected concentrations of the COPCs do not all occur in the same well. Also groundwater is not a static medium and the concentration at a well will likely change over time. Consequently the use of the maximum detected concentrations likely overestimates the risks calculated for exposures to groundwater.

EPCs for construction workers hypothetically exposed to VOCs migrating from shallow groundwater to air were estimated using a VDEQ model for exposure of construction workers to vapors accumulating in an excavation trench. Site-specific parameters such as groundwater concentrations were used in the model. However, it was necessary to use model default values for most of the other input parameters. The use of model default values tended to increase the uncertainty in the calculated risks. The direction of the uncertainty was not known, although the model default values are generally conservative and tend to overestimate air concentrations.

Land Use

The current land-use patterns at NAVSTA Newport are well established, thereby limiting the uncertainty associated with land-use assumptions. Land use at the Site is currently limited and is expected to be limited in the future, as long as the NAVSTA Newport remains active (construction workers, industrial workers, and potential and infrequent trespassers are the only current and likely future receptors). To be conservative, risks to hypothetical residents were also estimated for the site.

Exposure Routes and Receptor Identification

The determination of various receptor groups and exposure routes of potential concern was based on current land use at the site and anticipated future land use. Therefore, the uncertainty associated with the selection of exposure routes and potential receptors was minimal because they were considered to be well defined. Although industrial and residential use of groundwater was evaluated as an exposure scenario at the Site, groundwater is not currently used at the site, nor is it expected to be used in the future. Therefore, the evaluation of direct exposure to groundwater performed in this baseline HHRA was included primarily to aid in risk-management decision making.

As discussed in Section 5.1.3 several VOCs were detected in groundwater and soil gas samples from the North Waterfront and groundwater samples at Building 234 at concentrations exceeding USEPA screening levels for VOC migration from groundwater through building foundations and into interior air. At

present, there are no buildings at the North Waterfront or at former Building 234; consequently, the vapor intrusion exposure pathway is incomplete for current land use. It is possible that a building may be constructed on these areas in the future, but without knowing the details of the buildings there would be significant uncertainty associated with performing a quantitative evaluation of these areas using USEPA's Johnson and Ettinger volatilization model (2004). Instead, a semi-quantitative evaluation was conducted using USEPA's VISL Calculator (USEPA, May 2012).

Exposure Parameters

Each exposure factor selected for use in the risk assessment had some associated uncertainty. Generally, exposure factors were based on surveys of physiological and lifestyle profiles across the United States. The attributes and activities studied in these surveys generally had a broad distribution. To avoid underestimation of exposure, in most cases, USEPA guidelines on the RME receptor were used, which generally specify the use of the 95th percentile value for most parameters. Therefore, the selected values for the receptors represented an upper bound of the observed or expected habits of the majority of the population.

Generally, the uncertainty can be assessed quantitatively for many assumptions made in determining factors for calculating exposures and intakes. Many of these parameters were determined from statistical analyses on human population characteristics. Often, the database used to summarize a particular exposure parameter (i.e., body weight) is quite large. Consequently, the values chosen for such variables in the RME scenario have low uncertainty.

5.5.3 Uncertainty in the Toxicological Evaluation

Uncertainties associated with the toxicity assessment (determination of RfDs and CSFs and use of available criteria) are discussed in this section.

Derivation of Toxicity Criteria

Uncertainty associated with the toxicity assessment was associated with hazard assessment and dose-response evaluations for the COPCs. The hazard assessment characterized the nature and strength of the evidence of causation or the likelihood that a chemical that induces adverse effects in animals will also induce adverse effects in humans. Hazard assessment of carcinogenicity was evaluated as a weight-of-evidence determination using USEPA methods. Positive animal cancer test data may suggest that humans contain tissue(s) that may manifest a carcinogenic response; however, the animal

data cannot necessarily be used to predict the target tissue in humans. In the hazard assessment of non-cancer effects, however, positive animal data often suggest the nature of the effects (i.e., the target tissues and type of effects) anticipated in humans.

Uncertainty in hazard assessment arose from the nature and quality of the animal and human data. Uncertainty was reduced when similar effects were observed across species, strain, sex, and exposure route; when the magnitude of the response was clearly dose-related; when pharmacokinetic data indicated a similar fate in humans and animals; when postulated mechanisms of toxicity were similar for humans and animals; and when the COPC was structurally similar to other chemicals for which the toxicity is more completely characterized.

Uncertainty in the dose-response evaluation included the determination of a CSF for the carcinogenic assessment and derivation of an RfD for the non-carcinogenic assessment. Uncertainty was introduced from interspecies (animal to human) extrapolation, which, in the absence of quantitative pharmacokinetic or mechanistic data, is usually based on consideration of interspecies differences in basal metabolic rate. Uncertainty also resulted from intraspecies variation. Most toxicity experiments are performed with animals that are very similar in age and genotype, so intragroup biological variation is minimal, but the human population of concern may reflect a great deal of heterogeneity, including unusual sensitivity or tolerance to the COPC. Even toxicity data from human occupational exposure reflect a bias because only those individuals sufficiently healthy to attend work regularly (the "healthy worker effect") and those not unusually sensitive to the chemical are likely to be occupationally exposed. Finally, uncertainty arises from the quality of the key study from which the quantitative estimate was derived and the database used.

For cancer effects, the uncertainty associated with dose-response factors was mitigated by assuming the 95-percent upper bound for the slope factor. Another source of uncertainty in carcinogenic assessment is the method by which data from high doses in animal studies are extrapolated to the dose range expected for environmentally exposed humans. The linearized multistage model, which is used in nearly all quantitative estimations of human risk from animal data, is based on a nonthreshold assumption of carcinogenesis. Evidence suggests, however, that epigenetic carcinogens, as well as many genotoxic carcinogens, have a threshold below which they are non-carcinogenic. Therefore, the use of the linearized multistage model was conservative for chemicals that exhibited a threshold for carcinogenicity.

For non-cancer effects, additional uncertainty factors may have been applied in the derivation of the RfD to mitigate poor quality of the key study or gaps in the database. Additional uncertainty for non-cancer effects arose from the use of an effect level in the estimation of an RfD, because this estimation was predicated on the assumption of a threshold less than which adverse effects were not expected.

Therefore, an uncertainty factor is usually applied to estimate a no-effect level. Additional uncertainty arose in estimation of an RfD for chronic exposure from subchronic data. Unless empirical data indicated that effects did not worsen with increasing duration of exposure, an additional uncertainty factor was applied to the no-effect level in the subchronic study. Uncertainty in the derivation of RfDs was mitigated by the use of uncertainty and modifying factors that normally ranged between 3 and 10. The resulting combination of uncertainty and modifying factors may have reached 1,000 or more.

The derivation of dermal RfDs and CSFs from oral values may have caused uncertainty. This was particularly the case when no gastrointestinal absorption rates were available in the literature or when only qualitative statements regarding absorption were available.

Uncertainty in the Toxicity Criteria for Chromium

Toxicity criteria are available for different forms of chromium, which is considered to be more toxic in the hexavalent state. Although there is no evidence to support the conclusion that hexavalent chromium is present at the Site, risks associated with this chemical were assessed by conservatively assuming that 100 percent of the reported chromium result is attributable to hexavalent chromium. If chromium had been evaluated as trivalent chromium then ILCRs and HIs for chromium would be within acceptable levels and chromium would not have been retained as a COC for soil and groundwater. Also the cumulative ILCRs for exposures to groundwater at former Building 234 by hypothetical child and lifelong residents would be within USEPA acceptable levels, but still exceed the RIDEM cumulative cancer risk benchmark. Therefore, the risks calculated for chromium in soil and groundwater at the Site are likely overestimated.

Use of Chronic Toxicity Values for Construction Workers

Under the guidelines established by the Superfund program, the one year exposure duration assumed for the construction worker should be evaluated as a subchronic exposure. Risks for noncarcinogenic effects associated with subchronic exposures should be developed using subchronic toxicity criteria, not chronic toxicity values. Subchronic toxicity values used in this HHRA were obtained from USEPA's PPRTV internet site if available. Also, ATSDR Minimal Risk Levels (MRLs) were used as subchronic toxicity values when subchronic PPRTV values were not available. However, subchronic toxicity values are not as widely available as chronic toxicity values (e.g., subchronic toxicity criteria are not currently available for aluminum and manganese). Therefore, chronic toxicity values were used when subchronic toxicity values were not available. This likely resulted in an overestimation of potential noncarcinogenic risks for the construction worker receptor because subchronic toxicity values may be up to an order of magnitude

higher than chronic toxicity values. Therefore, the "unacceptable HIs" identified for current/future construction workers exposed through inhalation of aluminum and manganese in fugitive dust emissions from subsurface soil at the South Waterfront and PCB removal area may actually not exceed 1. Consequently, hazard indices for current/future construction workers may be within acceptable levels at the South Waterfront and PCB removal area.

5.5.4 Uncertainty in the Risk Characterization

Uncertainty in risk characterization resulted from assumptions made regarding additivity of effects from exposure to multiple COPCs from various exposure routes. High uncertainty exists when summing non-cancer risks for several substances across different exposure pathways. This assumes that each substance has a similar effect and/or mode of action. Even when chemicals affect the same target organs, they may have different mechanisms of action or differ in their fate in the body, so additivity may not be an appropriate assumption in all cases. However, the assumption of additivity was considered because in most cases it represented a conservative estimate of risk.

Risks to any individual may also have been overestimated by summing multiple assumed exposure pathway risks for any single receptor. Although every effort was made to develop reasonable scenarios, not all individual receptors may be exposed via all pathways considered.

Finally, the risk characterization did not consider antagonistic or synergistic effects. Little or no information was available to determine the potential for antagonism or synergism for the COPCs. Because chemical-specific interactions could not be predicted, the likelihood for risks to be overpredicted or underpredicted could not be defined, but the methodology used was based on current USEPA guidance.

5.6 SUMMARY

The baseline HHRA for the Former Robert E. Derecktor Shipyard at the NAVSTA Newport was conducted to characterize the potential risks to likely human receptors under current and potential future land use. This HHRA is an update of the HHRA presented in the SASE Report (B&RE, June 1997). Potential receptors under current land use are construction workers, industrial workers, and adolescent and adult trespassers. Potential receptors evaluated in the HHRA for future land use are construction workers, industrial workers, adolescent and adult trespassers, and hypothetical child and adult residents. Although future land use is likely to be the same as current land use, potential future receptors were evaluated in the baseline HHRA, primarily for decision-making purposes.

The Site was divided into five areas for the purposes of selecting COPCs; the North Waterfront, Central Shipyard, Building 234, South Waterfront, and the PCB Removal Area. Chemicals retained as COPCs are summarized in Table 5-29. PAHs and metals were retained as COPCs in soil. VOCs and metals were retained as COPCs in groundwater.

Quantitative estimates of non-carcinogenic and carcinogenic risks (HIs and ILCRs, respectively) were developed for potential human receptors. All receptors were evaluated for exposures to surface soil (0 to 2 foot bgs) and subsurface soil (> 2 ft. bgs). Current/future construction workers, future industrial workers, and hypothetical residents were also evaluated for exposures to groundwater. The results of the HHRA are summarized below. Chemicals retained as COCs are summarized in Tables 5-53 and 5-57.

Noncarcinogenic Risks

HIs on a target organ basis for all receptors exposed to site-related COPCs in surface and subsurface soil were less than or equal to unity (1), with the exception of hypothetical child residents exposed to subsurface soil at the PCB removal area. Arsenic was the major contributor to the HI for hypothetical child residents.

HIs for all receptors exposed to site-related COPCs in groundwater were less than or equal to unity (1), with the exception of hypothetical child and adult residents at the North Waterfront, future industrial workers, hypothetical child residents, and hypothetical adult residents at the Central Shipyard and hypothetical child residents at former Building 234. TCE was the major contributor to the HI for hypothetical child and adult residents exposed to groundwater at the North Waterfront. Arsenic and manganese were the major contributors to the HI for future industrial workers exposed to groundwater at the Central Shipyard. Arsenic, cobalt, iron, and manganese were the major contributor to the HI for hypothetical child and adult residents exposed to groundwater at the Central Shipyard. Manganese were the major contributors to the HI for hypothetical child residents exposed to groundwater at former Building 234.

Carcinogenic Risks

ILCRs for the following receptors/media exceed USEPA and RIDEM risk management benchmarks:

Area	Medium	ILCR Exceeds USEPA's Target Risk Range of 10^{-4} to 10^{-6}	ILCR Exceeds RIDEM's Cumulative Risk Level of 10^{-5}
North Waterfront	Surface Soil	ILCRs within Target Risk Range	Hypothetical Child Residents Hypothetical Lifelong Residents
	Subsurface	ILCRs within Target Risk Range	Hypothetical Child Residents

Area	Medium	ILCR Exceeds USEPA's Target Risk Range of 10^{-4} to 10^{-6}	ILCR Exceeds RIDEM's Cumulative Risk Level of 10^{-5}
	Soil		Hypothetical Lifelong Residents
	Groundwater	ILCRs within Target Risk Range	Hypothetical Child Residents Hypothetical Adult Residents Hypothetical Lifelong Residents
Central Shipyard	Surface Soil	ILCRs within Target Risk Range	Current Industrial Workers Future Industrial Workers Hypothetical Child Residents Hypothetical Adult Residents Hypothetical Lifelong Residents
	Subsurface Soil	ILCRs within Target Risk Range	Future Industrial Workers Hypothetical Child Residents Hypothetical Adult Residents Hypothetical Lifelong Residents
	Groundwater	Future Industrial Workers Hypothetical Child Residents Hypothetical Adult Residents Hypothetical Lifelong Residents	Future Industrial Workers Hypothetical Child Residents Hypothetical Adult Residents Hypothetical Lifelong Residents
Building 234	Surface Soil	Hypothetical Child Residents Hypothetical Lifelong Residents	Current Industrial Workers Future Industrial Workers Hypothetical Child Residents Hypothetical Adult Residents Hypothetical Lifelong Residents
	Subsurface Soil	ILCRs within Target Risk Range	Future Industrial Workers Hypothetical Child Residents Hypothetical Adult Residents Hypothetical Lifelong Residents
	Groundwater	ILCRs within Target Risk Range	Future Industrial Workers Hypothetical Child Residents Hypothetical Adult Residents Hypothetical Lifelong Residents
South Waterfront	Subsurface Soil	ILCRs within Target Risk Range	Future Industrial Workers Hypothetical Child Residents Hypothetical Adult Residents Hypothetical Lifelong Residents
PCB Removal Area	Surface Soil	Hypothetical Child Residents Hypothetical Lifelong Residents	Future Adolescent Trespassers Future Lifelong Trespassers Future Industrial Workers Hypothetical Child Residents Hypothetical Adult Residents Hypothetical Lifelong Residents
	Subsurface Soil	Hypothetical Lifelong Residents	Future Industrial Workers Hypothetical Child Residents Hypothetical Adult Residents Hypothetical Lifelong Residents

Carcinogenic PAHs, arsenic, and chromium were the major contributors to the ILCRs for surface soil at former Building 234. Carcinogenic PAHs, total Aroclors, and arsenic were the major contributors to the ILCRs for surface soil and subsurface soil at PCB removal area. Arsenic was the major contributor to the ILCRs at the Central Shipyard.

Chromium speciation was not performed on the soil samples collected at the site, therefore, chromium was evaluated as hexavalent chromium in this HHRA. If chromium had been evaluated as trivalent chromium then ILCRs and HIs for chromium would be within acceptable levels and chromium would not have been retained as a COC for surface soil at Former Building 234 and subsurface soil at the PCB Removal Area. In addition, the cumulative ILCRs for exposures to surface soil at former Building 234 by hypothetical child and lifelong residents would be within USEPA acceptable levels, but would still exceed the RIDEM cumulative cancer risk benchmark. Cumulative ILCRs for exposures to subsurface soil at the PCB Removal Area would be equal to the upper bound of USEPA's target risk range, but would still exceed the RIDEM cumulative cancer risk benchmark.

6.0 SUMMARY AND CONCLUSIONS

Section 6.0 presents a summary of activities and results of the On-Shore Derecktor Shipyard SASE Addendum investigation along with the conclusions and recommendations formulated from the investigation moving forward for this Site.

6.1 OBJECTIVES

The project objectives of the SASE Addendum investigation were to collect additional environmental media samples and to obtain analytical data from areas where data gaps in media quality were identified by the Navy and regulatory agencies. This data, along with historical site data, will be used to revise the 1997 baseline HHRA and to provide recommendations for future actions at the Site.

Historical environmental media sampling efforts designed to evaluate media quality were conducted in 1996 at the Site following a sandblast grit removal action in 1995. A series of additional removal actions were completed at the Site over the period from 1997 through 2007. A review of the historic dataset for the site by the Navy and regulatory agencies determined a need for supplemental confirmatory data in areas where removal actions were conducted, and a need for data in other areas containing potential contamination.

This SASE Addendum also revises the human health risk assessment presented in the SASE using historic and new data to recalculate risks to potential human receptors.

6.2 FIELD INVESTIGATION

The SASE Addendum investigation was conducted in five subareas of the Site including: the Southern Waterfront, former Building 234, the Central Shipyard, the PCB Removal Area (Building 6/TP-14 Area), and the Northern Waterfront. Field activities completed as part of this investigation included the advancement of soil borings, monitoring well installation, groundwater sampling, and soil gas sampling.

Thirteen surface soil samples (included three duplicate samples), 11 subsurface soil samples, 14 groundwater samples (including two duplicates), and five soil gas samples (including 1 duplicate) were collected for laboratory analysis and reporting. Laboratory analysis was sample specific but included VOCs, DRO/GRO, PAHs, PCBs, and metals.

6.3 NATURE AND EXTENT OF CONTAMINATION

This report summarizes environmental media quality data collected as part of the 2011 SASE Addendum investigation at the Site. Analytical data from previous investigatory efforts at the Site are provided in the 1997 SASE report included as Appendix E-6 of this report.

Contaminant-specific concentrations were compared to PALs established in the Work Plan Addendum. PALs for soil consisted of the lowest of the USEPA RSLs (2010) and the RIDEM Residential Soil DEC. PALs for groundwater consisted of the lowest of USEPA MCL and the RIDEM GA groundwater aquifer criteria. PALs for soil gas were derived from USEPA residential air RSLs adjusted by an attenuation factor of 0.1 for shallow soil gas and 0.01 for deep soil gas.

Southern Waterfront Area

Exceedances of the USEPA RSL screening criteria for 6 metals were identified in subsurface soil samples at the Site. Although metals in subsurface soil exceed the USEPA RSL, it is possible that the exceedances of some or all of the metals may be due to the generally elevated background levels of metals found in Newport soils.

Building 234

Analytical results from the groundwater sample MW08 collected in this area did not contain any VOCs, PAHs, or metals above regulatory comparison criteria. Exploratory borings conducted at Sump 234-4 confirmed a concrete bottom and therefore no soil samples for laboratory analysis and reporting were collected.

Central Shipyard

Analytical results from two groundwater samples (MW218 and MW219) did not identify any VOCs or PAHs above regulatory comparison criteria. Arsenic was the only metal detected in groundwater at a concentration exceeding the MCL. The high concentrations of arsenic may be attributable to naturally high background levels of arsenic in Newport soils.

The Central Shipyard was the location of temporary USMC office trailers, were removed in 2012. As part of the removal process utilities associated with the trailers, including buried electrical conduits, water line, septic tank and piping were removed for off-site disposal. The Final Site Clean Up document for this effort is provided in Appendix H.

PCB Removal Area

Elevated concentrations of PAHs (with eight compounds exceeding criteria) and metals (with six constituents exceeding RSLs) were detected in surface soil samples collected from the PCB Removal Area. SB209 contained concentrations of aroclor-1260 exceeding regulatory comparison criteria. In subsurface soil samples, slightly elevated concentrations of PAHs (with four PAHs exceeding criteria) and metals (with six metals exceeding criteria) were detected. Analytical results from four surface soil samples (SB215, SB216, SB217, and SB224) collected in the former transformer bank area did not detect PCBs above the laboratory instruments method detection limits. The distribution of contaminants suggests that the 1999 removal action conducted in this area adequately addressed PCB contamination. A sample located in an area receiving surface water runoff from a section of the Penn-Central Railway contained metals above criteria.

Northern Waterfront

Huts 1 and 2

Elevated concentrations of PAHs (with four compounds exceeding criteria) and metals (with seven constituents exceeding criteria) were detected in surface soil samples. In subsurface soil samples, elevated concentrations of PAHs (with two compounds exceeding RSLs) and metals with (four individual constituents exceeding RSLs) in subsurface soil samples collected from the Huts 1 and 2 area. A groundwater sample (MW204) collected in this area did not identify any contaminants above regulatory comparison criteria (VOCs and metals) or above the laboratory instruments method detection limits (PAHs).

Contaminants detected at this subarea of the Site are consistent with historical operations and activities that were conducted in this area, including vehicle maintenance. Groundwater quality results indicate that no contaminants are leaching into the overburden groundwater aquifer. This area was the site of a satellite parking lot construction project and several sample locations may have subsequently been covered by bituminous concrete paving. The former building concrete pad for Huts 1 and 2 has been demolished and removed under a previous action by the Navy.

Groundwater

Eight groundwater monitoring wells were sampled in the Northern Waterfront Area. One VOC, TCE, was detected above regulatory comparison criteria in five of the eight groundwater samples. A comparison to the 1997 SASE groundwater analytical results indicated that VOC concentrations are lower in the 2011 sampling event than in historical sampling events. TCE is most likely the result of limited spills in former storage areas and maintenance areas that have had limited impact on the overburden groundwater aquifer.

Soil Gas

Elevated concentrations of five VOCs (1,3-butadiene, acrylonitrile, benzene, tetrachloroethene, and TCE) were found in soil gas samples at concentrations exceeding USEPA comparison criteria. To ensure protection of human health, the vapor intrusion pathway will be considered in future building construction.

6.4 HUMAN HEALTH RISK ASSESSMENT

The HHRA completed in this SASE Addendum calculated risk for each of the five areas of the Site. Soil, groundwater, and soil gas analytical results from the historic and recent sampling events were used in the HHRA. Risk was evaluated for receptor exposure under residential and non-residential (industrial, commercial, and recreational) land use scenarios. The dataset used in the HHRA included groundwater and soil gas data from 2011; and soil data from 1996, 2011, and removal action confirmation samples.

Potential receptors under current land use are construction workers, industrial workers, and adolescent and adult trespassers. Potential receptors evaluated in the HHRA for future land use are construction workers, industrial workers, adolescent and adult trespassers, and hypothetical child and adult residents. Although future land use is likely to be the same as current land use, potential future receptors were evaluated in the baseline HHRA, primarily for decision-making purposes.

The Site was divided into five areas for the purposes of selecting COPCs; the North Waterfront, Central Shipyard, Building 234, South Waterfront, and the Building 6/Test Pit 14 PCB Removal area. PAHs and metals were retained as COPCs in soil. VOCs and metals were retained as COPCs in groundwater.

Quantitative estimates of non-carcinogenic and carcinogenic risks (HIs and ILCRs, respectively) were developed for potential human receptors. All receptors were evaluated for exposures to surface soil (0 to 2 foot bgs) and subsurface soil (> 2 ft. bgs). Current/future construction workers, future industrial workers, and hypothetical residents were also evaluated for exposures to groundwater.

Noncarcinogenic Risks

Arsenic was the major contributor to the HI for hypothetical child residents exposed to subsurface soil at the PCB removal area.

TCE was the major contributor to the HI for hypothetical child and adult residents exposed to groundwater at the North Waterfront. Manganese was the major contributor to the HI for future industrial workers exposed to groundwater at the Central Shipyard. Arsenic, cobalt, iron, and manganese were the major contributors to the HI for hypothetical child and adult residents exposed to groundwater at the Central

Shipyard. Manganese was the major contributor to the HI for hypothetical child residents exposed to groundwater at former Building 234.

Carcinogenic Risks

Cancer risks exceeding USEPA cancer risk range (10^{-4} to 10^{-6}) was determined for hypothetical residents in one area for groundwater and in two areas for soil. In addition, cancer risks exceeding the RIDEM cancer risk threshold of 10^{-5} was determined for hypothetical receptors in each area and for current industrial workers in two areas and future industrial workers in three areas, and future trespassers in the PCB Removal Area.

The following table summarizes carcinogenic risks that exceed the USEPA cancer target risk range.

Area	Medium	Receptor	Contaminant Contributing to Cancer Risk
Central Shipyard	Groundwater	Future Industrial Workers (2E-04) Hypothetical Child Residents (6E-04) Hypothetical Adult Residents (1E-03) Hypothetical Lifelong Residents (2E-03)	Arsenic
Building 234	Surface Soil	Hypothetical Child Residents (3E-04) Hypothetical Lifelong Residents (4E-04)	PAHs, arsenic, chromium
PCB Removal Area	Surface Soil	Hypothetical Child Residents (5E-04) Hypothetical Lifelong Residents (5E-04)	PAHs, arsenic
	Subsurface Soil	Hypothetical Lifelong Residents (2E-04)	PAHs, arsenic, chromium

Chromium speciation was not performed on the soil and groundwater samples; therefore chromium was evaluated as hexavalent chromium in the HHRA. If chromium had been evaluated as trivalent chromium then all risks from chromium would have been within USEPA and RIDEM acceptable levels.

6.5 RECOMMENDATIONS

The On-Shore Derecktor Site is currently located on an active portion of NAVSTA Newport. Several construction projects are being conducted at the site to improve the site for future Navy and USCG use. Future land use will not include residential use due to the industrial nature of the site and the on-going Navy infrastructure constructions plans.

The conclusions of the risk assessment determined that risk under the residential use scenario is present for soil and groundwater. Risk under the future industrial user scenario is present due to inadvertent ingestion of groundwater containing arsenic and manganese. Several removal actions have been conducted at the site to remove sources of contamination present from previous site uses.

This SASE addendum fulfills the role of a Remedial Investigation for this site because this report, coupled with the previous SASE report, contains the risk assessment component required by CERCLA. Based on the risks estimated for the residential and industrial workers scenarios, it is recommended that the Site be carried forward to a Feasibility Study (FS) step which will evaluate remedial alternatives for soil and groundwater.

TABLES

TABLE 3-1
SOIL BORING SAMPLE SUMMARY
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RI
PAGE 1 OF 2

LOCATION	DEPTH INTERVAL (FT)	PID READING (ppmv)	COMMENTS	SAMPLE ID	SAMPLE DATE	SAMPLE TIME
SB201	0-2	0.1				
	2-4	0.6	HSA Sample collected	DSY-SB201-SO-204	2/11/2011	0835
	4-6	0.2				
	6-8	0.1				
	8-10	0.5				
	10-12	0.0				
	12-14	0.1				
	14-16	0.4				
SB202	16-18	0.3				
	0-2	0.4				
	2-4	0.3	HSA Sample collected	DSY-SB202-SO-204	2/9/2011	1345
	4-6	0.3				
	6-8	0.1				
	8-10	0.1				
	10-12	0.1				
	12-14	0.2				
SB203	14-16	0.0				
	16-18	0.2				
	0-1	NR				
SB204	2-4	NR				
	4-5	NR				
	0-2	0.1	HSA Sample collected at surface	DSY-SB204-SO-0002	2/11/2011	1400
	2-4	0.5				
	4-6	0.1				
	6-8	0.1				
	8-10	0.4	HSA Sample collected	DSY-SB204-SO-0810	2/11/2011	1210
	10-12	0.2				
SB205	12-14	0.5				
	14-16	0.1				
	16-18	0.0				
	0-2	0.2	HSA Sample collected at surface	DSY-SB205-SO-0002	2/15/2011	1210
	2-4	0.1				
	4-6	0.3				
	6-8	0.2				
	8-10	0.2	HSA Sample collected	DSY-SB205-SO-0809	2/15/2011	1230
	10-12	0.2				
	12-14	0.2				
	14-16	0.3				
	16-16.4	NR				

TABLE 3-1
SOIL BORING SAMPLE SUMMARY
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RI
PAGE 2 OF 2

LOCATION	DEPTH INTERVAL (FT)	PID READING (ppmv)	COMMENTS	SAMPLE ID	SAMPLE DATE	SAMPLE TIME
SB206	0-1	0.0	HSA Sample collected at surface	DSY-SB206-SO-0002	2/14/2011	1430
	2-4	NR				
	4-6	0.0				
	6-8	0.0				
	8-10	0.1	HSA Sample collected	DSY-SB206-SO-0810	2/14/2011	1455
	10-12	0.0				
SB207	12-14	0.1				
	0-1	0.1	HSA Sample collected at surface	DSY-SB207-SO-0002	2/15/2011	0905
	2-4	0.0				
	4-6	0.0				
	6-8	0.0				
	8-10	0.1				
SB208	10-12	0.1	HSA Sample collected	DSY-SB207-SO-1012	2/15/2011	0935
	12-14	0.1				
SB208	0-0.5	NR	Hand auger Sample collected at surface	DSY-SO-SB208-000.5	2/25/2011	1405
SB209	0.3-0.7	NR	DPT Sample collected at surface below asphalt layer	DSY-SO-SB209-0.30.7	2/25/2011	1005
SB210	0102	NR	DPT Sample collected at surface	DSY-SO-SB210-0102	2/25/2011	1235
SB211	0102	NR	DPT Sample collected at surface	DSY-SO-SB210-0102	2/25/2011	1335
SB212	0002	NR				
	0204	NR	DPT Sample collected	DSY-SO-SB212-0204	2/25/2011	1500
SB213	0002	NR				
	0203	NR	DPT Sample collected	DSY-SO-SB213-0203	2/25/2011	1325
SB214	0002	NR				
	0203	NR	DPT Sample collected	DSY-SO-SB214-0203	2/25/2011	1340
SB215	0-0.5	NR	HSA Sample collected at surface	DSY-SO-SB215-000.5	2/22/2011	1500
SB216	0-0.5	NR	HSA Sample collected at surface	DSY-SO-SB216-000.5	2/22/2011	1535
SB217	0-0.5	NR	HSA Sample collected at surface	DSY-SO-SB217-000.5	2/22/2011	1540
SB224	0-0.5	NR	HSA Sample collected at surface	DSY-SO-SB224-000.5	2/22/2011	1600

HSA: hollow stem auger
DPT: direct puch technology

**TABLE 3-2
SAMPLE LOCATION SUMMARY
FORMER ROBERT E. DERECKTOR
NAVSTA NEWPORT, NEWPORT, RI
PAGE 1 OF 2**

SAMPLE LOCATION ID	LOCATION	WELL SCREEN INTERVAL (Ft BTOR)	JUSTIFICATION
Borings			
SB201	Southern Waterfront Area	NA	To investigate potential PAH or metals contamination in Section 6 of the Southern Waterfront area
SB202	Southern Waterfront Area	NA	To investigate potential PAH or metals contamination in Section 6 of the Southern Waterfront area
SB203	Sump 234-4	NA	To investigate potential contamination in the bottom of former sump 234-4
SB204	Huts 1 and 2	NA	To investigate potential soil and groundwater contamination in the vicinity of TP-16 and TP-27
SB205	Huts 1 and 2	NA	To investigate potential soil contamination in the vicinity of TP-16
SB206	Huts 1 and 2	NA	To investigate potential soil contamination in the vicinity of TP-16
SB207	Huts 1 and 2	NA	To investigate potential soil contamination in the vicinity of TP-16
SB208	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB209	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB210	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB211	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB212	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB213	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB214	Building 6/TP-14 Area	NA	To investigate potential soil contamination in the vicinity of the Building 6/TP-14 PCB removal area
SB215	Building 6/TP-14 Area (Transformer Bank)	NA	To investigate potential PCB soil contamination beneath the gravel layer in the transformer bank area
SB216	Building 6/TP-14 Area (Transformer Bank)	NA	To investigate potential PCB soil contamination beneath the gravel layer in the transformer bank area
SB217	Building 6/TP-14 Area (Transformer Bank)	NA	To investigate potential PCB soil contamination beneath the gravel layer in the transformer bank area
SB224	Building 6/TP-14 Area (Transformer Bank)	NA	To investigate potential PCB soil contamination beneath the gravel layer in the transformer bank area

**TABLE 3-2
SAMPLE LOCATION SUMMARY
FORMER ROBERT E. DERECKTOR
NAVSTA NEWPORT, NEWPORT, RI
PAGE 2 OF 2**

SAMPLE LOCATION ID	LOCATION	WELL SCREEN INTERVAL (Ft BTOR)	JUSTIFICATION
Monitoring Wells			
MW08 (existing well)	Northeast of former Building 234 in area of former USTs and former machine shop	6.05 – 11.05	To investigate potential impact from former USTs and machine shop to shallow overburden aquifer (area of TP-26)
MW218	Building 42	10 - 20	To investigate potential contamination in shallow overburden groundwater downgradient of TP- 25
MW219	Building 42	10 - 20	To investigate potential contamination in shallow overburden groundwater downgradient of sump S42-1
MW02A (replacement well)	Northern Waterfront Area (West of former oil discharge area)	16 - 26	To investigate potential groundwater contamination in the vicinity of areas of former oil discharges to soil and groundwater
MW03 (existing well)	Northern Waterfront Area (former Hazardous Waste Storage Area)	5.79 – 15.79	Assess impacts of hazardous waste storage area on deep portions of soil and groundwater
MW11A (replacement well)	Northern Waterfront Area (Between Pier 2 and the Former Hazardous Waste Storage Area)	5 - 10	Assess impacts of former storage areas and other disposal on deep portions of overburden aquifer
MW12 (existing well)	Northern Waterfront Area (Between Pier 1 and the Former Hazardous Waste Storage Area)	15 - 25	Assess impacts of former storage areas and other disposal on deep portions of overburden aquifer
MW204	Huts 1 and 2	8 - 18	To investigate potential groundwater contamination in the vicinity of TP-16 and TP-17.
MW220	Northern Waterfront Area	5 - 20	To investigate potential groundwater contamination downgradient of the former hazardous waste storage area
MW221	Northern Waterfront Area	3 - 15	To investigate potential groundwater contamination downgradient of the former hazardous waste storage area
MW222	Northern Waterfront Area	4 - 14	To investigate potential groundwater contamination in the central portion of the Northern Waterfront Area
MW223	Northern Waterfront Area (Upgradient location)	41 - 51	To provide an upgradient/background groundwater data point
Soil Gas			
SG-MW02A	Northern Waterfront Area	7 – 8*	Co-located with existing groundwater monitoring well MW02, to assess potential presence of VOCs in soil gas
SG-MW12	Northern Waterfront Area	5-6*	Co-located with existing groundwater monitoring well MW12, to assess potential presence of VOCs in soil gas
SG-MW03	Northern Waterfront Area	6.5 – 8*	Co-located with existing groundwater monitoring well MW03, to assess potential presence of VOCs in soil gas
SG-MW11	Northern Waterfront Area	2-3*	Co-located with previous existing groundwater monitoring well MW11(destroyed), to assess potential presence of VOCs in soil gas

NA = not applicable

--- monitoring wells could not be located during the February March sample round.

* Soil Gas "screen interval measurements" reflect distance from top of probe to bottom of probe (ft bgs).

TABLE 3-3
MONITORING WELL CONSTRUCTION DETAILS SUMMARY
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RI

LOCATION	WELL TYPE	DIAMETER (inches)	SCREENED INTERVAL	NORTHING*	EASTING*	TOP CASE ELEVATION	TOP RISER ELEVATION	GROUND ELEVATION
DSY-MW219	Overburden	2	10 -20	161155.86	379641.84	16.98	16.77	14.1
DSY-MW08 (existing)	Overburden	2	6.05 - 11.05	160822.44	379991.86	11.60	11.13	11.1
DSY-MW2A	Overburden	2	16 - 26	161948.08	379410.23	12.97	12.87	10.1
DSY-MW223	Bedrock	2	41 - 51	162730.29	379643.75	48.82	48.30	48.3
DSY-MW204	Overburden	2	8 - 18	161829.14	379641.02	12.38	12.03	12.0
DSY-MW218	Overburden	2	10 - 20	161532.84	379577.95	16.95	16.67	13.8
DSY-MW220	Overburden	2	5 -20	162294.72	379304.57	9.97	9.62	9.6
DSY-MW221	Overburden	2	3 - 15	162438.96	379372.49	10.54	10.14	10.1
DSY-MW12 (existing)	Overburden	2	15 - 25	162318.64	379382.82	10.69	10.28	10.3
DSY-MW03 (existing)	Overburden	2	5.79 - 15.79	162472.23	379433.81	11.82	11.30	11.3
DSY-MW11A	Overburden	2	5 - 10	162882.04	379225.08	--	--	10.2
DSY-MW222	Overburden	2	4 -14	162645.56	379356.34	10.92	10.53	10.5

Vertical control datum : NGVD 1929 MSL

Horizontal control datum: NAD 1983 (1986)

MW11A was a temporary monitoring well and was not present at the time of surveying. Northing and easting coordinates are for the co-located soil gas sample location.

TABLE 3-4
MONITORING WELL DEVELOPMENT STABILIZATION SUMMARY
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RI

WELL ID	DEVELOPMENT DATE	SCREENED INTERVAL (bgs)	PUMP TYPE	INITIAL CLOCK TIME	FINAL CLOCK TIME	WATER DEPTH BELOW MP (ft)	CUM. VOLUME PURGED (L)	TEMP (C°)	SPEC COND (µS/cm)	PH	TURBIDITY (NTU)	COMMENTS
MW219	3/7/2011	10 -20	waterra	0915	1315	15.33	405	8.80	0.695	9.92	437	
MW08	2/15/2011	6.05 - 11.05	waterra	0925	1310	7.28	245.5	7.10	1.044	6.28	202	
MW2A	2/16/2011	16 - 26	waterra	1135	1520	12.05	462.95	9.41	1.074	7.97	85.1	
MW223	3/8/2011	41 - 51	waterra	0855	1255	12.78	550.5	14.30	0.311	6.73	87.6	
MW204	3/7/2011	8 - 18	waterra	1353	1753	10.71	526.5	9.10	0.466	6.02	NR	
MW218	2/16/2011	10 - 20	waterra	0905	1700	15.20	1294	12.00	1.099	6.69	12.3	
MW220	2/17/2011	5 -20	waterra	0911	1259	8.50	228	NR	NR	NR	NR	
MW221	2/18/2011	3 - 15	waterra	0942	1342	7.64	324.9	12.00	0.514	6.17	1456	
MW12	2/17/2011	15 - 25	waterra	0929	1314	8.86	392.8	12.30	0.612	7.25	220	hard bottom
MW03	2/14/2011	5.79 - 15.79	waterra	1149	1542	11.62	345.2	10.60	0.402	5.81	246	
MW11A	NA	5 - 10	NA	NA	NA	6.11	NA	NA	NA	NA	NA	Temporary well
MW222	2/22/2011	4 -14	waterra	0747	1147	5.85	285.3	6.60	0.821	7.54	NR	

NR = Not Recorded

TABLE 3-5
MONITORING WELL SAMPLE PURGE STABILIZATION SUMMARY
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RI
PAGE 1 OF 2

WELL ID	DATE	START TIME	FINAL READ-ING TIMES	WATER DEPTH	PURGE RATE (ml/min)	CUM. VOLUME PURGED (L)	TEMP (C°)	SPECIFIC COND. (mS/cm)	DO (mg/L)	PH	ORP (mV)	SALINITY (ppth)	TURBIDITY (NTU)	COMMENTS
MW02A	2/24/2011	0951	1200	11.45	150	22.78	12	0.806	0.22	8.58	-134.10	0.40	2.76	
			1206	11.45	150		12.1	0.805	0.22	8.58	-140.10	0.40	2.96	
			1210	11.45	150		11.9	0.808	0.24	8.57	-144.5	0.40	2.35	
MW03	2/24/2011	1346	1456	7.43	240	18.415	11.3	0.436	4.12	5.49	48.6	0.21	2.56	
			1500	7.43	240		11.2	0.436	4.11	5.49	50.8	0.21	3.09	
			1505	7.43	240		11.2	0.435	4.10	5.49	52.4	0.21	2.38	
MW08	3/1/2011	1027	1117	7.09	100	6	8.2	896	0.40	6.30	92.1	0.44	6.79	
			1122	7.10	100		8.2	896	0.43	6.30	92.3	0.44	4.06	
			1127	7.11	100		8.2	895	0.43	6.30	92.7	0.44	3.75	
MW11A	2/26/2011	1119	12.54	6.74	225	23.65	12.9	0.534	0.34	6.60	-173.5	0.26	9.31	
			12.59	6.74	225		13.0	0.530	0.34	6.59	-172.1	0.26	8.73	
			13.04	6.74	225		12.9	0.530	0.35	6.56	-169.9	0.26	7.36	
MW12	3/3/2011	1150	1410	8.35	225	33.75	10.7	0.628	0.21	7.96	-9.8	0.31	3.39	
			1415	8.35	225		10.8	0.628	0.21	7.96	-14.6	0.31	4.13	
			1420	8.35	225		10.9	0.628	0.27	7.96	-18.8	0.31	3.09	
MW204	3/17/2011	0916	1032	10.60	130	11.96	10.3	485.9	2.54	6.11	205.1	NR	16	
			1044	10.60	130		10.5	486.2	2.50	6.08	204.0	NR	16	
			1048	10.60	130		10.5	487.0	2.47	6.08	203.7	NR	15	
MW218	3/1/2011	1257	1347	14.97	250	15.25	10.2	0.854	0.24	6.47	17.0	0.42	13.8	
			1352	14.98	250		10.2	0.856	0.25	6.47	12.1	0.42	13.6	
			1357	14.99	250		10.2	0.864	0.27	6.48	7.7	0.43	13.0	
MW219	3/16/2011	0852	1000	14.94	130	10.43	8.7	707.7	0.24	6.99	-108.5	NR	18	
			1005	14.94	130		8.7	707.6	0.25	7.00	-109.3	NR	17	
			1010	14.94	130		8.6	706.9	0.29	7.00	-109.4	NR	15	
MW220	3/1/2011	1015	1130	8.45	200	16.375	9.0	5.687	1.11	7.25	-80.1	3.09	4.84	
			1135	8.46	200		9.0	5.675	0.97	7.25	-84.5	3.08	3.29	
			1140	8.46	200		9.1	5.651	0.98	7.26	-88.9	3.07	3.15	
MW221	3/2/2011	1249	1324	7.15	225	9.875	9.7	0.606	0.86	5.92	148.6	0.30	1.66	
			1329	7.15	200		9.5	0.602	0.85	5.91	146.9	0.29	0.86	
			1334	7.15	200		9.6	0.594	0.84	5.90	144.9	0.29	0.86	

TABLE 3-5
MONITORING WELL SAMPLE PURGE STABILIZATION SUMMARY
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RI
PAGE 2 OF 2

WELL ID	DATE	START TIME	FINAL READ-ING TIMES	WATER DEPTH	PURGE RATE (ml/min)	CUM. VOLUME PURGED (L)	TEMP (C°)	SPECIFIC COND. (mS/cm)	DO (mg/L)	PH	ORP (mV)	SALINITY (ppth)	TURBIDITY (NTU)	COMMENTS
MW222	3/2/2001	1012	1102	5.10	250	17	7.1	1.056	6.46	7.37	143.4	0.53	14.30	
			1107	5.10	250		7.1	1.061	6.41	7.35	139.0	0.53	15.00	
			1112	5.10	250		7.1	1.057	6.40	7.39	133.9	0.52	14.20	
MW223	3/16/2011	1446	1329	11.98	100	20	12.3	323.6	0.36	6.80	-49.4	0.36	55.00	
			1334	11.98	100		12.2	327.0	0.30	6.81	-52.5	0.30	55.00	
			1338	11.98	100		12.1	326.1	0.29	6.81	-57.7	0.29	50.00	

NR = not recorded

TABLE 3-6
SOIL GAS SAMPLE COLLECTION SUMMARY
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RI

WELL ID	COLLECTION DATE	SAMPLE COLLECTION TIME	FINAL PRESSURE (IN. HG)	SAMPLE DEPTH (FT BGS)	COMMENTS
DSY-SG-MW02A	2/24/2011	1105 - 1145	- 2	7 - 8	None
DSY-SG-MW03/DUP01	2/24/2011	1530 - 1605	- 4	6.5 - 8	None
DSY-SG-MW11A	3/3/2011	1220 - 1250	-7.5	2-3	A shallow sample was collected due to the presence of a high water table
DSY-SG-MW12	3/3/2011	1519 - 1549	-7	5 - 6	None

TABLE 4-1
ANALYTICAL RESULTS - SURFACE SOIL
ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

SAMPLE ID				DSY-SB204-SO-0002	DSY-SB204-SO-0002-D	DSY-SB204-SO-0002-AVG	DSY-SB205-SO-0002	DSY-SB206-SO-0002	DSY-SB207-SO-0002	DSY-SO-SB208-000.5	DSY-SO-SB208-000.5-D	DSY-SO-SB208-000.5-AVG	DSY-SO-SB209-0.30.7	DSY-SO-SB215-000.5	DSY-SO-SB216-000.5	DSY-SO-SB217-000.5	DSY-SO-SB224-000.5	DSY-SO-SB224-000.5-D	DSY-SO-SB224-000.5-AVG
TARGET AREA				HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209	DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.3 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH				2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE_NCx0_1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM	NM	FD	NM
VOLATILES (UG/KG)																			
2-BUTANONE	2800000	10000000	2800000	5.52 U	3.26 J	3.01 J	5.43 U	3.92 U	4.17 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-HEXANONE	21000		21000	2.76 U	4.96 J	3.17 J	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ACETONE	6100000	7800000	6100000	11 UJ	31.4 J	18.4 J	27.3 J	9.96 J	16.5 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	82000		82000	2.76 U	2.5 U	2.63 U	3.28 J	1.96 U	2.09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG)																			
2-METHYLNAPHTHALENE	31000	123000	31000	18 U	17.9 U	18 U	18.9 U	3.56 U	14.5 J	33.1 J	18.8 J	26 J	299	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	340000	43000	43000	18 U	17.9 U	18 U	17.8 J	3.56 U	17.2 U	36.7 J	10 J	23.4 J	1000	NA	NA	NA	NA	NA	NA
ACENAPHTHYLENE	340000	23000	23000	18 U	17.9 U	18 U	19.9 J	3.56 U	17.2 U	3.97 U	3.94 U	3.96 U	695	NA	NA	NA	NA	NA	NA
ANTHRACENE	1700000	35000	35000	18 U	17.9 U	18 U	51.1	3.56 U	17.2 U	45.1 J	3.94 UJ	23.5 J	2290	NA	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE	150	900	150	22.5 J	17.9 UJ	15.7 J	232 J	3.56 UJ	31.8 J	149 J	51.5 J	100 J	5740	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	15	400	15	14.5 J	17.9 U	11.7 J	165	3.56 U	29.6 J	129 J	46.3 J	87.6 J	4920	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	150	900	150	22.1 J	17.9 U	15.5 J	263	3.56 U	54	194 J	67.4 J	131 J	7120	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	170000	800	800	18 U	17.9 U	18 U	119	1.92 J	25.8 J	59.5 J	28.4 J	44 J	2070	NA	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	1500	900	900	18 U	17.9 U	18 U	92.4	3.56 U	15.8 J	71.2 J	28.8 J	50 J	2480	NA	NA	NA	NA	NA	NA
CHRYSENE	15000	400	400	24.1 J	17.9 U	16.5 J	238	3.56 U	39.8	161 J	48.1 J	105 J	5650	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	15	400	15	18 U	17.9 U	18 U	124	3.56 U	17.2 U	24.7	10.1 J	17.4 J	820	NA	NA	NA	NA	NA	NA
FLUORANTHENE	230000	20000	20000	31 J	17.9 U	20 J	424	3.56 U	50.6	350 J	103 J	226 J	13400	NA	NA	NA	NA	NA	NA
FLUORENE	230000	28000	28000	18 U	17.9 U	18 U	21.7 J	3.56 U	17.2 U	29.5	6.3 J	17.9 J	1220	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	150	900	150	15.1 J	17.9 U	12 J	99.1	3.56 U	24.6 J	55.1 J	23.5 J	39.3 J	2070	NA	NA	NA	NA	NA	NA
NAPHTHALENE	3600	54000	3600	18 U	17.9 U	18 U	18.9 U	3.56 U	18.4 J	24.5 J	14.7 J	19.6 J	751	NA	NA	NA	NA	NA	NA
PHENANTHRENE	170000	40000	40000	13.6 J	17.9 U	11.3 J	235	3.56 U	34.5	280 J	77.9 J	179 J	9530	NA	NA	NA	NA	NA	NA
PYRENE	170000	13000	13000	31.2 J	17.9 U	20.1 J	371	3.05 J	46.1	264 J	79.1 J	172 J	10100	NA	NA	NA	NA	NA	NA
PCBS (UG/KG)																			
AROCLOR-1260	220		220	NA	NA	NA	NA	NA	NA	24.7 J	24.2 J	24.4 J	416 J	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
TOTAL AROCLOR	220	10000	220	NA	NA	NA	NA	NA	NA	24.7 J	24.2 J	24.4 J	416 J	18.1 UJ	17.7 UJ	17.8 UJ	17.8 UJ	17.2 UJ	17.5 UJ

TABLE 4-1
ANALYTICAL RESULTS - SURFACE SOIL
ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

SAMPLE ID				DSY-SB204-SO-0002	DSY-SB204-SO-0002-D	DSY-SB204-SO-0002-AVG	DSY-SB205-SO-0002	DSY-SB206-SO-0002	DSY-SB207-SO-0002	DSY-SO-SB208-000.5	DSY-SO-SB208-000.5-D	DSY-SO-SB208-000.5-AVG	DSY-SO-SB209-0.30.7	DSY-SO-SB215-000.5	DSY-SO-SB216-000.5	DSY-SO-SB217-000.5	DSY-SO-SB224-000.5	DSY-SO-SB224-000.5-D	DSY-SO-SB224-000.5-AVG
TARGET AREA				HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209	DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.3 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH				2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE_NCx0_1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM	NM	FD	NM
METALS (MG/KG)																			
ALUMINUM	7700		7700	5740	5380	5560	9650	5850	6720	10900	10900	10900	9120	NA	NA	NA	NA	NA	NA
ARSENIC	0.39	7	0.39	3.35	3.57	3.46	9.81	2.41	6.16	21.8 J	21.6 J	21.7 J	10.4 J	NA	NA	NA	NA	NA	NA
BARIUM	1500	5500	1500	6.46	6.2	6.33	33.2	11.6	18.2	26.1 J	35.4 J	30.8 J	22.6 J	NA	NA	NA	NA	NA	NA
BERYLLIUM	16	0.4	0.4	0.243 J	0.234 J	0.238 J	0.658	0.38	0.462 J	0.57 J	0.576	0.573 J	0.463	NA	NA	NA	NA	NA	NA
CADMIUM	7	39	7	0.11 U	0.111 U	0.11 U	0.229 UJ	0.109 U	0.208 U	0.603 U	0.122 U	0.362 U	0.232 J	NA	NA	NA	NA	NA	NA
CALCIUM				1710	650	1180	2290	695	715	416 J	611 J	514 J	1110 J	NA	NA	NA	NA	NA	NA
CHROMIUM	0.29	390	0.29	9.16	8.14	8.65	16.1	9.79	9.58	14.6	13.9	14.2	12.8	NA	NA	NA	NA	NA	NA
COBALT	2.3		2.3	4.55	4.05	4.3	9.56	3.94	6.42	14.6 J	13.9 J	14.2 J	8.62 J	NA	NA	NA	NA	NA	NA
COPPER	310	3100	310	8.07 J	7.7 J	7.88 J	39.1 J	6.65 J	21.6 J	23.4 J	24.8 J	24.1 J	33.5 J	NA	NA	NA	NA	NA	NA
IRON	5500		5500	16100	14700	15400	27100	13900	19600	32000	28800	30400	22500	NA	NA	NA	NA	NA	NA
LEAD	400	150	150	4.18 J	3.95 J	4.06 J	50.6 J	3.38 J	24.9 J	18.4 J	16.4 J	17.4 J	26.5 J	NA	NA	NA	NA	NA	NA
MAGNESIUM				2120	1940	2030	2680	2300	2100	2840	2910	2880	2910	NA	NA	NA	NA	NA	NA
MANGANESE	180	390	180	148 J	135 J	142 J	337 J	155 J	149 J	435	348	392	293	NA	NA	NA	NA	NA	NA
MERCURY	0.56	23	0.56	0.0292 U	0.0379 U	0.0336 U	0.037	0.038 U	0.0204 J	0.0247 J	0.0359 U	0.0213 J	0.0168 J	NA	NA	NA	NA	NA	NA
NICKEL	150	1000	150	12.2	11.5	11.8	21.4	12	15.8	25.5	26.3	25.9	21.1	NA	NA	NA	NA	NA	NA
POTASSIUM				271 J	287 J	279 J	614 J	639 J	318 J	904 U	304 J	378 J	394 J	NA	NA	NA	NA	NA	NA
SELENIUM	39	390	39	0.276 UJ	0.277 UJ	0.276 UJ	0.572 UJ	0.273 UJ	0.52 UJ	1.51 U	0.631	0.693	0.301 J	NA	NA	NA	NA	NA	NA
SODIUM				166 U	166 U	166 U	343 U	164 U	312 U	904 U	182 U	543 U	71.4 J	NA	NA	NA	NA	NA	NA
VANADIUM	39	550	39	10.3	8.84	9.57	21.1	9.48	12.3	25.1	18.6	21.8	14.2	NA	NA	NA	NA	NA	NA
ZINC	2300	6000	2300	28.1 J	25.3 J	26.7 J	77 J	26.2 J	51.5 J	75.5 J	86.4 J	81 J	137 J	NA	NA	NA	NA	NA	NA
PETROLEUM HYDROCARBONS (MG/KG)																			
DIESEL RANGE ORGANICS		500	500	7.08 U	12.8	8.17	29.8	7.11 U	31.6	44.8	35.5	40.2	366	NA	NA	NA	NA	NA	NA
GASOLINE RANGE ORGANICS		500	500	5.87 U	4.28 U	5.08 U	4.48 U	5.52 U	4.06 U	2.83 J	4.82 J	3.82 J	3.74 U	NA	NA	NA	NA	NA	NA

Notes:

EPARSLSORE_NCx 0.1 - USEPA Regional Screening Level for Residential Soil, June 2011. Carcinogenic values represent an incremental cancer risk of 1E-06. The noncarcinogenic values are the RSL divided by 10 to correspond to a Target Hazard Quotient of 0.1.

RISORES - Rhode Island Department of Environmental Management (RIDEM) Residential Soil Criteria, DEM-DSR-01-93, February 2004.

MIN_SO - lowest of the RSL and RIDEM criteria

TABLE 4-2
ANALYTICAL RESULTS - SUBSURFACE SOIL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

SAMPLE ID				DSY-SB201-SO-0204	DSY-SB202-SO-0204	DSY-SB204-SO-0810	DSY-SB205-SO-088.5	DSY-SB206-SO-0810	DSY-SB207-SO-1012	DSY-SO-SB210-0102	DSY-SO-SB211-0102	DSY-SO-SB212-0204	DSY-SO-SB213-0203	DSY-SO-SB214-0203
TARGET AREA				SOUTHERN WATERFRONT	SOUTHERN WATERFRONT	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
SACODE	EPARSLSOR E_NCx0_1	RISORES	MIN_SO	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
VOLATILES (UG/KG)														
CARBON DISULFIDE	82000		82000	NA	NA	2.65 U	2.6 J	2.51 U	2.16 U	NA	NA	NA	NA	NA
M+P-XYLENES				NA	NA	2.8 J	4.36 U	5.03 U	4.32 U	NA	NA	NA	NA	NA
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG)														
2-METHYLNAPHTHALENE	31000	123000	31000	3.66 U	3.61 U	3.42 U	3.48 U	3.53 U	3.63 U	3.83 U	8.89 J	3.38 J	3.9 U	281
ACENAPHTHENE	340000	43000	43000	3.66 U	3.61 U	3.42 U	3.62 J	3.53 U	3.63 U	3.83 U	4.11 U	3.53 U	2.87 J	5.63 U
ACENAPHTHYLENE	340000	23000	23000	3.66 U	3.61 U	3.42 U	3.53 J	3.53 U	3.63 U	5.21 J	3.5 J	14.2	3.9 U	47.2
ANTHRACENE	1700000	35000	35000	3.66 U	3.61 U	3.42 U	8	3.53 U	3.63 U	5.83 J	4.11 U	17.2	4.71 J	5.63 U
BENZO(A)ANTHRACENE	150	900	150	3.66 UJ	3.61 UJ	3.42 UJ	27 J	3.53 UJ	3.63 UJ	41.3	38.1	60.5	32.5	252
BENZO(A)PYRENE	15	400	15	3.66 U	3.61 U	3.42 U	23.3	3.53 U	3.63 U	26.3	29.9	38.3	18.9	172
BENZO(B)FLUORANTHENE	150	900	150	3.66 U	3.61 U	3.42 U	41.1	3.53 U	2.65 J	38.8	44.4	57.9	26.6	336
BENZO(G,H,I)PERYLENE	170000	800	800	3.66 U	3.61 U	3.42 U	21.6	3.53 U	2.51 J	15.7	21	20	10.7 J	91.1
BENZO(K)FLUORANTHENE	1500	900	900	3.66 U	3.61 U	3.42 U	11.2	3.53 U	3.63 U	16.1	17.5	25.6	11.3 J	124
CHRYSENE	15000	400	400	3.66 U	3.61 U	3.42 U	32.1	3.53 U	3.63 U	28.6	30.4	44.7	20.5	356
DIBENZO(A,H)ANTHRACENE	15	400	15	3.66 U	3.61 U	3.42 U	23.3	3.53 U	3.63 U	3.83 U	7.48 J	7.89 J	3.9 U	43.7
FLUORANTHENE	230000	20000	20000	3.66 U	3.61 U	3.42 U	55.3	3.53 U	2.19 J	61.2	39.6	128	43.2	451
FLUORENE	230000	28000	28000	3.66 U	3.61 U	3.42 U	2.93 J	3.53 U	3.63 U	2.22 J	4.11 U	8.85 J	2.67 J	5.63 U
INDENO(1,2,3-CD)PYRENE	150	900	150	3.66 U	3.61 U	3.42 U	18	3.53 U	3.63 U	12.3 J	18.5	17.4	10.2 J	82.7
NAPHTHALENE	3600	54000	3600	3.66 U	3.61 U	3.42 U	3.54 J	3.53 U	3.63 U	2.5 J	9.04 J	5.06 J	3.9 U	175
PHENANTHRENE	170000	40000	40000	3.66 U	3.61 U	3.42 U	30.8	3.53 U	2.1 J	24.8	25.2	91.3	25.8	400
PYRENE	170000	13000	13000	3.66 U	3.61 U	3.42 U	47.4	3.53 U	2.05 J	50.1	35.8	94.2	33.9	375

**TABLE 4-2
ANALYTICAL RESULTS - SUBSURFACE SOIL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID				DSY-SB201-SO-0204	DSY-SB202-SO-0204	DSY-SB204-SO-0810	DSY-SB205-SO-088.5	DSY-SB206-SO-0810	DSY-SB207-SO-1012	DSY-SO-SB210-0102	DSY-SO-SB211-0102	DSY-SO-SB212-0204	DSY-SO-SB213-0203	DSY-SO-SB214-0203
TARGET AREA				SOUTHERN WATERFRONT	SOUTHERN WATERFRONT	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
SACODE	EPARSLSOR E_NCx0_1	RISORES	MIN_SO	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
METALS (MG/KG)														
ALUMINUM	7700		7700	17400	15900	3290	5790	3190	6100	12600	11700	2180	12500	9150
ANTIMONY	3.1	10	3.1	0.912 UJ	0.858 UJ	0.425 UJ	0.84 UJ	0.43 UJ	0.88 UJ	2.38 UJ	0.476 UJ	0.428 UJ	2.27 UJ	1.15 J
ARSENIC	0.39	7	0.39	15.9	26.3	3.62	7.42	4.44	9.79	13 J	13.5 J	1.47 J	11.8 J	47.2 J
BARIUM	1500	5500	1500	14.6	14.8	4.5	8.85	4.43	5.11	24.2 J	31 J	20.4 J	16.4 J	57.7 J
BERYLLIUM	16	0.4	0.4	0.418 J	0.392 J	0.176 J	0.314 J	0.204 J	0.34 J	0.511 J	0.607	0.697	0.507 J	0.759
CADMIUM	7	39	7	0.228 U	0.214 U	0.106 U	0.21 U	0.108 U	0.22 U	0.595 U	0.119 U	0.107 U	0.567 U	0.0903 J
CALCIUM				1770	1000	443	1020	429	496 J	620 J	279 J	501 J	631 J	2040 J
CHROMIUM	0.29	390	0.29	21.2	18.2	4.98	9.49	5.27	8.77	15.4	12	0.788	18.5	11.6
COBALT	2.3		2.3	17.9	21.1	5.15	4.54	3.68	5.85	11.1 J	8.75 J	1.29 J	12.4 J	17 J
COPPER	310	3100	310	29.9 J	28.2 J	4.42 J	12.5 J	5.25 J	11.7 J	20 J	13.7 J	1.67 J	19.1 J	39.5 J
IRON	5500		5500	44400	45500	9830	18300	12200	20900	35900	23600	6800	30900	22100
LEAD	400	150	150	9.49 J	13.6 J	1.96 J	13.8 J	2.81 J	8.23 J	12 J	16.1 J	2.49 J	17 J	81.4 J
MAGNESIUM				5220	4850	1110	1830	1110	1850	3610	2280	646	4010	2030
MANGANESE	180	390	180	488 J	681 J	169 J	145 J	95.7 J	171 J	428	358	305	346	1190
MERCURY	0.56	23	0.56	0.0351 U	0.0312 U	0.0331 U	0.0125 J	0.03 U	0.031 U	0.0138 J	0.0323 J	0.0276 U	0.0343 U	0.0603
NICKEL	150	1000	150	38.6	37.9	9.68	12.5	8.8	15	22.7	17	0.596	25.9	22
POTASSIUM				243 J	257 J	219 J	248 J	188 J	161 J	242 J	226 J	681 J	346 J	264 J
SELENIUM	39	390	39	0.57 UJ	0.536 U	0.16 J	0.525 UJ	0.269 UJ	0.55 UJ	1.49 U	0.67	0.268 U	1.42 U	1.31
SODIUM				342 U	322 U	160 U	315 U	161 U	330 U	179 U	178 U	161 U	170 U	90.6 J
VANADIUM	39	550	39	18.6	17.7	5.82	11	6.12	12.4	19.8	17.7	3.97	20.6	19.3
ZINC	2300	6000	2300	72.8 J	75.7 J	17.9 J	36 J	21.9 J	41.1 J	65.9 J	53.6 J	27.1 J	64.7 J	335 J
PETROLEUM HYDROCARBONS (MG/KG)														
DIESEL RANGE ORGANICS		500	500	NA	NA	7.49	6.99 U	6.83 U	7.31 U	37.6	48.2	17.8	25	NA

Notes:

EPARSLSORE_NCx 0.1 - USEPA Regional Screening Level for Residential Soil, June 2011. Carcinogenic values represent an incremental cancer risk of 1E-06. The noncarcinogenic values are the RSL divided by 10 to correspond to a Target Hazard Quotient of 0.1.

RISORES - Rhode Island Department of Environmental Management (RIDEM) Residential Soil Criteria, DEM-DSR-01-93, February 2004.

MIN_SO - lowest of the RSL and RIDEM criteria

TABLE 4-3
ANALYTICAL RESULTS - GROUNDWATER
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

SAMPLE ID				DSY-GW-MW02A-022411	DSY-GW-MW03-022411	DSY-GW-MW08-030111	DSY-GW-MW11A-022611	DSY-GW-MW11A-022611-D	DSY-GW-MW11A-022611-AVG	DSY-GW-MW12-030311	DSY-GW-MW204-031711	DSY-GW-MW218-030111	DSY-GW-MW219-031611	DSY-GW-MW219-031611-D	DSY-GW-MW219-031611-AVG	DSY-GW-MW220-030111	DSY-GW-MW221-030211	DSY-GW-MW222-030211	DSY-GW-MW223-031611
TARGET AREA				NORTHERN WATERFRONT	NORTHERN WATERFRONT	BLDG. 234 AREA	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	HUTS 1 AND 2	BLDG. 42	BLDG. 42	BLDG. 42	BLDG 42	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT (UPGRADIENT LOC.)
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204	DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11	03/01/11	03/16/11	03/16/11	03/16/11	03/01/11	03/02/11	03/02/11	03/16/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM
VOLATILES (UG/L)																			
1,1-DICHLOROETHENE	7	7	7	0.5 U	0.5 U	0.25 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE				5 UJ	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	3.28 J	2.89 J	5 U	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	70	70	70	0.291 J	0.5 U	12.7	0.284 J	0.361 J	0.322 J	3.73	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	4.26	1.49	0.5 U	0.5 U
TETRACHLOROETHENE	5	5	5	0.5 U	0.696 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOTAL 1,2-DICHLOROETHENE				0.291 J	0.5 U	12.7	0.953 J	1.04 J	0.996 J	8.54	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5.36	1.49	0.5 U	0.5 U
TRANS-1,2-DICHLOROETHENE	100	100	100	0.5 U	0.5 U	0.5 U	0.669 J	0.683 J	0.676 J	4.81	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.1	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	5	5	5	0.5 U	7.35	3.9	5.15	4.97	5.06	9.61	3.16	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12.2	5.48	0.5 U
TRICHLOROFLUOROMETHANE				1 UJ	1 UJ	0.581 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
VINYL CHLORIDE	2	2	2	0.5 U	0.5 U	0.263 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.47	0.5 U	0.5 U	0.5 U
METALS (UG/L)																			
ALUMINUM				NA	NA	53.7	NA	NA	NA	NA	337	52.9	312	274	293	NA	NA	NA	NA
ARSENIC	10		10	NA	NA	1.32 J	NA	NA	NA	NA	1.5 UJ	27.8	74.5 J	78.1 J	76.3 J	NA	NA	NA	NA
BARIUM	2000	2000	2000	NA	NA	17	NA	NA	NA	NA	11.6	86.6	34	34.9	34.4	NA	NA	NA	NA
CADMIUM	5	5	5	NA	NA	0.286 J	NA	NA	NA	NA	0.5 U	0.5 U	1.53	1.41	1.47	NA	NA	NA	NA
CALCIUM				NA	NA	46800	NA	NA	NA	NA	29100 J	79700	38400 J	40000 J	39200 J	NA	NA	NA	NA
CHROMIUM	100	100	100	NA	NA	1 U	NA	NA	NA	NA	0.508 J	5 U	1 U	1 U	1 U	NA	NA	NA	NA
COBALT				NA	NA	1.74 J	NA	NA	NA	NA	2.5 U	24.8	13.7	14.1	13.9	NA	NA	NA	NA
COPPER	1300		1300	NA	NA	1.57 J	NA	NA	NA	NA	2 U	2 U	2 U	2 U	2 U	NA	NA	NA	NA
IRON				NA	NA	459	NA	NA	NA	NA	605 J	11100	61900 J	65800 J	63800 J	NA	NA	NA	NA
LEAD	15	15	15	NA	NA	0.75 U	NA	NA	NA	NA	0.75 U	3.75 U	1.28	1.07	1.18	NA	NA	NA	NA
MAGNESIUM				NA	NA	9790	NA	NA	NA	NA	7110 J	16700	8090 J	8400 J	8240 J	NA	NA	NA	NA
MANGANESE				NA	NA	532	NA	NA	NA	NA	53.9	9100	4510	4880	4700	NA	NA	NA	NA
NICKEL		100	100	NA	NA	2.08 J	NA	NA	NA	NA	3.38	4.64	1.5 U	1.5 U	1.5 U	NA	NA	NA	NA
POTASSIUM				NA	NA	5120	NA	NA	NA	NA	1660	11000	5970	6200	6080	NA	NA	NA	NA
SELENIUM	50	50	50	NA	NA	1.25 U	NA	NA	NA	NA	1.25 U	6.25 U	1.55 J	1.24 J	1.4 J	NA	NA	NA	NA
SODIUM				NA	NA	111000	NA	NA	NA	NA	40100	62700	34400	35400	34900	NA	NA	NA	NA
ZINC				NA	NA	29.8 J	NA	NA	NA	NA	6.65	3.59 J	1.58 J	1.52 J	1.55 J	NA	NA	NA	NA

TABLE 4-3
ANALYTICAL RESULTS - GROUNDWATER
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

SAMPLE ID				DSY-GW-MW02A-022411	DSY-GW-MW03-022411	DSY-GW-MW08-030111	DSY-GW-MW11A-022611	DSY-GW-MW11A-022611-D	DSY-GW-MW11A-022611-AVG	DSY-GW-MW12-030311	DSY-GW-MW204-031711	DSY-GW-MW218-030111	DSY-GW-MW219-031611	DSY-GW-MW219-031611-D	DSY-GW-MW219-031611-AVG	DSY-GW-MW220-030111	DSY-GW-MW221-030211	DSY-GW-MW222-030211	DSY-GW-MW223-031611
TARGET AREA				NORTHERN WATERFRONT	NORTHERN WATERFRONT	BLDG. 234 AREA	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	HUTS 1 AND 2	BLDG. 42	BLDG. 42	BLDG. 42	BLDG 42	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT (UPGRADIENT LOC.)
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204	DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11	03/01/11	03/16/11	03/16/11	03/16/11	03/01/11	03/02/11	03/02/11	03/16/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM	NM	NM	NM
DISSOLVED METALS (UG/L)																			
ALUMINUM				NA	NA	36.6 J	NA	NA	NA	NA	72	29.7 J	36.9 J	38 J	37.4 J	NA	NA	NA	NA
ARSENIC	10		10	NA	NA	1.37 J	NA	NA	NA	NA	1.5 UJ	29.1	77.1 J	78.9 J	78 J	NA	NA	NA	NA
BARIUM	2000	2000	2000	NA	NA	16.1	NA	NA	NA	NA	11.5	84.4	34.4	33.7	34	NA	NA	NA	NA
CADMIUM	5	5	5	NA	NA	0.274 J	NA	NA	NA	NA	0.5 U	0.5 U	1.62	1.52	1.57	NA	NA	NA	NA
CALCIUM				NA	NA	47800	NA	NA	NA	NA	30800 J	76600	39400 J	39000 J	39200 J	NA	NA	NA	NA
COBALT				NA	NA	1.78 J	NA	NA	NA	NA	2.5 U	24.2	13.7	13.6	13.6	NA	NA	NA	NA
COPPER	1300		1300	NA	NA	1.17 J	NA	NA	NA	NA	1.19 J	2 U	2 U	2 U	2 U	NA	NA	NA	NA
IRON				NA	NA	423	NA	NA	NA	NA	50.5 J	9900	63900 J	62600 J	63200 J	NA	NA	NA	NA
LEAD	15	15	15	NA	NA	0.75 U	NA	NA	NA	NA	0.75 U	3.75 U	0.667 J	0.488 J	0.578 J	NA	NA	NA	NA
MAGNESIUM				NA	NA	9790	NA	NA	NA	NA	7450 J	16200	8260 J	8090 J	8180 J	NA	NA	NA	NA
MANGANESE				NA	NA	531	NA	NA	NA	NA	53.3	8680	4980	4610	4800	NA	NA	NA	NA
NICKEL		100	100	NA	NA	1.75 J	NA	NA	NA	NA	3.39	4.73	1.75 U	1.75 U	1.75 U	NA	NA	NA	NA
POTASSIUM				NA	NA	5010	NA	NA	NA	NA	1770	10800	6390	6240	6320	NA	NA	NA	NA
SELENIUM	50	50	50	NA	NA	1.25 U	NA	NA	NA	NA	1.25 U	6.25 U	1.34 J	1.44 J	1.39 J	NA	NA	NA	NA
SODIUM				NA	NA	114000	NA	NA	NA	NA	42300	61900	35800	35900	35800	NA	NA	NA	NA
ZINC				NA	NA	16.6	NA	NA	NA	NA	6.48	3.5 J	2.5 U	2.5 U	2.5 U	NA	NA	NA	NA

Notes:

FEDMCL - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites,
June, 2011. [Cancer benchmark value = 1E-06, Hazard index (HI) = 0.1].

RIGAOB - Rhode Island Department of Environmental Management GA Groundwater Criteria, RIDEM, DEM-DSR-01-93, February 2004.

MIN_GW - lowest of the MCL and RIDEM criteria

TABLE 4-4
ANALYTICAL RESULTS - SOIL GAS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

SAMPLE ID			DSY-SG-MW02A-0708	DSY-SG-MW03-0608	DSY-SG-MW03-0608-D	DSY-SG-MW03-0608-AVG	DSY-SG-MW11A-0203	DSY-SG-MW12-0506
TARGET AREA			NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT
LOCATION ID			DSY-MW02A	DSY-MW03	DSY-MW03	DSY-MW03	DSY-MW11A	DSY-MW12
SAMPLE DATE			02/24/11	02/24/11	02/24/11	02/24/11	03/03/11	03/03/11
TOP DEPTH								
BOTTOM DEPTH								
SACODE			NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
SUBMATRIX			NA	NA	NA	NA	NA	NA
QC TYPE	VISGR1	VISGR01	NM	NM	FD	NM	NM	NM
VOLATILES (UG/M3)								
1,1,1-TRICHLOROETHANE	5200	52000	0.1 J	0.26	0.26	0.26	0.11 J	0.055 J
1,1,2-TRICHLOROTRIFLUOROETHANE	31000	310000	0.79 J	0.5 J	0.53 J	0.515 J	0.6 J	0.57 J
1,1-DICHLOROETHANE	15	150	0.25	0.16	0.076 J	0.118 J	0.11 J	0.086 J
1,2,4-TRIMETHYLBENZENE	7.3	73	0.38 J	2.4 J	0.35 UJ	1.29 J	0.58 J	1
1,3,5-TRIMETHYLBENZENE ³	7.3	73	0.34 U	1.1	0.35 U	0.638	0.39 U	0.3 J
1,3-BUTADIENE	0.81	8.1	3.1	2.3	2.3	2.3	13	6.4
1-ETHYL-4-METHYL BENZENE	NA	NA	0.36 J	1.5 J	0.35 UJ	0.838 J	0.47 J	1
2-BUTANONE	5200	52000	3.3	6.1	5.2	5.65	17	11
2-HEXANONE	31	310	0.28 J	1.1 U	1.1 U	1.1 U	0.83 J	1 J
4-METHYL-2-PENTANONE	3100	31000	0.87	0.26 J	0.21 J	0.235 J	0.84	0.97
ACRYLONITRILE	0.36	3.6	1.4 U	1.5 U	1.5 U	1.5 U	2.8	1.8 U
BENZENE	3.1	31	5.2	0.71	0.67	0.69	6.8	4.8
CHLOROBENZENE	52	520	0.31 U	0.32 U	0.32 U	0.32 U	0.3 J	0.17 J
CHLOROETHANE	10000	100000	0.17 U	0.18 U	0.18 U	0.18 U	1.3 J	0.6 J
CHLOROFORM	1.1	11	0.18 J	0.14 J	0.15 J	0.145 J	0.7 J	0.27 J
CHLOROMETHANE	94	940	0.13 U	0.14 U	0.14 U	0.14 U	4.9	1.3
CIS-1,2-DICHLOROETHENE	63	630	0.14	0.062 J	0.014 U	0.0345 J	27	0.017 U
CYCLOHEXANE	6300	63000	1.8	0.24 U	0.24 U	0.24 U	0.3 J	0.44 J
DICHLORODIFLUOROMETHANE	100	1000	2.2	3	3	3	2.4	2
ETHYLBENZENE	9.7	97	1.1	0.25 J	0.13 J	0.19 J	0.57	0.92
HEXANE	730	7300	4.8	2.1	1.7	1.9	3.4	3
M+P-XYLENES ¹	100	1000	0.87	0.73 J	0.15 J	0.44 J	0.81	1.7
METHYL TERT-BUTYL ETHER	94	940	0.0085 J	0.014 U	0.014 U	0.014 U	0.016 U	0.015 J
METHYLENE CHLORIDE	52	520	0.23 U	1.5	0.65 J	1.08 J	0.8 J	1 J
N-HEPTANE	NA	NA	1.8	0.47 J	0.6	0.535 J	1.6	2.7
O-XYLENE	100	1000	0.34	0.58 J	0.064 J	0.322 J	0.41	0.8
STYRENE	1000	10000	0.28 U	0.29 U	0.29 U	0.29 U	0.69	0.43 J
TETRACHLOROETHENE	4.1	41	4.7	1	1.1	1.05	12	1.5
TOLUENE	5200	52000	7.2	0.8	0.67	0.735	2.6	3.5
TOTAL 1,2-DICHLOROETHENE ⁴	63	630	0.14	0.062 J	0.014 U	0.0345 J	31.1	0.017 U
TOTAL XYLENES	100	1000	1.21	1.31 J	0.214 J	0.762 J	1.22	2.5
TRANS-1,2-DICHLOROETHENE	63	630	0.013 U	0.014 U	0.014 U	0.014 U	4.1	0.017 U
TRICHLOROETHENE ^{2,5}	2.1	21	0.088 J	7.7	7.8	7.75	120	1.3
TRICHLOROFLUOROMETHANE	730	7300	1.9	1.8	1.8	1.8	1.8	7.4
VINYL CHLORIDE	1.6	16	0.76	0.39 J	0.15 J	0.27 J	0.49	0.32

Notes: - USEPA Regional Screening Level, June 2011. Values is the residential air screening level adjusted using an attenuation factor of 0.1 (VISGR1) and 0.01 (VISGR01).
Carcinogenic values represent an incremental cancer risk of 1E-06.

Noncarcinogenic values represent a hazard quotient of 0.1.

1 - Value is for m-xylene.

2 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.

3 - Value is for 1,2,4-trimethylbenzene.

4 - Value is for trans-1,2-dichloroethene.

5 - Screening criteria for trichloroethene was calculated using toxicity criteria from IRIS.

**TABLE 5-1
SCREENING CRITERIA FOR SOIL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RI
PAGE 1 OF 2**

CAS No.	Parameter	USEPA Regional Screening Levels ⁽¹⁾		Rhode Island Department of Environmental Management ⁽²⁾	
		Direct Contact Residential	Protection of Groundwater	Direct Exposure Residential	GA Leachability Criteria
Volatile Organic Compounds (ug/kg)					
78-93-3	2-Butanone	2,800,000 N	1,000	10,000,000	NA
591-78-6	2-Hexanone	21,000 N	7.9	NA	NA
67-64-1	Acetone	6,100,000 N	2,400	7,800,000	NA
71-43-2	Benzene	1,100 C	0.2	2,500	200
75-15-0	Carbon Disulfide	82,000 N	210	NA	NA
108-90-7	Chlorobenzene	29,000 N	49	210,000	3,200
100-41-4	Ethylbenzene	5,400 C	1.5	71,000	27,000
- -	m+p-Xylenes	59,000 N ⁽³⁾	180 ⁽³⁾	110,000 ⁽¹¹⁾	NA
75-09-2	Methylene Chloride	36,000 N ⁽⁴⁾	2.5	45,000	NA
108-88-3	Toluene	500,000 N	590	190,000	32,000
540-59-0	Total 1,2-Dichloroethene	70,000 N	37	630,000	NA
1330-20-7	Total Xylenes	63,000 N	190	110,000	540,000
79-01-6	Trichloroethene	440 N ⁽⁴⁾	0.16	13,000	200
Semivolatile Organic Compounds (ug/kg)					
108-60-1	2,2'-Oxybis(1-chloropropane)	4,600 C	0.11	NA	NA
91-57-6	2-Methylnaphthalene	23,000 N	140	123,000	NA
95-48-7	2-Methylphenol	310,000 N	580	NA	NA
106-44-5	4-Methylphenol	610,000 N	1,100	NA	NA
83-32-9	Acenaphthene	340,000 N	4,100	43,000	NA
208-96-8	Acenaphthylene	340,000 N ⁽⁵⁾	4,100 ⁽⁵⁾	23,000	NA
120-12-7	Anthracene	1,700,000 N	42,000	35,000	NA
56-55-3	Benzo(a)anthracene	150 C	10	900	NA
50-32-8	Benzo(a)pyrene	15 C	3.5	400	240,000
205-99-2	Benzo(b)fluoranthene	150 C	35	900	NA
191-24-2	Benzo(g,h,i)perylene	170,000 N ⁽⁶⁾	9,500 ⁽⁶⁾	800	NA
207-08-9	Benzo(k)fluoranthene	1,500 C	350	900	NA
117-81-7	Bis(2-ethylhexyl)phthalate	35,000 C	17	46,000	120,000
85-68-7	Butyl Benzyl Phthalate	260,000 C	200	NA	NA
86-74-8	Carbazole	NA	NA	NA	NA
218-01-9	Chrysene	15,000 C	1,100	400	NA
53-70-3	Dibenzo(a,h)anthracene	15 C	11	400	NA
84-74-2	di-n-Butyl Phthalate	610,000 N	1,700	NA	NA
117-84-0	di-n-Octyl Phthalate	NA	NA	NA	NA
206-44-0	Fluoranthene	230,000 N	70,000	20,000	NA
86-73-7	Fluorene	230,000 N	4,000	28,000	NA
67-72-1	Hexachloroethane	4,300 N ⁽⁴⁾	0.48	46,000	NA
193-39-5	Indeno(1,2,3-cd)pyrene	150 C	120	900	NA
91-20-3	Naphthalene	3,600 C	0.47	54,000	800
85-01-8	Phenanthrene	170,000 N ⁽⁶⁾	9,500 ⁽⁶⁾	40,000	NA
108-95-2	Phenol	1,800,000 N	2,600	6,000,000	NA
129-00-0	Pyrene	170,000 N	9,500	13,000	NA
Pesticides/PCBs (ug/kg)					
72-54-8	4,4'-DDD	2,000 C	66	NA	NA
72-55-9	4,4'-DDE	1,400 C	46	NA	NA
50-29-3	4,4'-DDT	1,700 C	67	NA	NA
309-00-2	Aldrin	29 C	0.034	NA	NA
5103-71-9	alpha-Chlordane	1,600 C ⁽⁷⁾	1.8 ⁽⁷⁾	500 ⁽⁷⁾	1,400 ⁽⁷⁾
11097-69-1	Aroclor-1254	110 N ⁽⁴⁾	8.8	NA	NA
11096-82-5	Aroclor-1260	220 C	24	NA	NA
60-57-1	Dieldrin	30 C	0.061	40	NA
72-20-8	Endrin	1,800 N	68	NA	NA
5103-74-2	gamma-Chlordane	1,600 C ⁽⁷⁾	1.8 ⁽⁷⁾	500 ⁽⁷⁾	1,400 ⁽⁷⁾
76-44-8	Heptachlor	110 C	0.14	NA	NA
1024-57-3	Heptachlor Epoxide	53 C	0.068	NA	NA
1336-36-3	Total Aroclors	220 C	26	10,000	10,000
Metals (mg/kg)					
7429-90-5	Aluminum	7,700 N	23,000	NA	NA
7440-36-0	Antimony	3.1 N	0.27	10	0.05 ⁽¹²⁾
7440-38-2	Arsenic	0.39 C	0.0013	7	NA

**TABLE 5-1
SCREENING CRITERIA FOR SOIL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RI
PAGE 2 OF 2**

CAS No.	Parameter	USEPA Regional Screening Levels ⁽¹⁾		Rhode Island Department of Environmental Management ⁽²⁾	
		Direct Contact Residential	Protection of Groundwater	Direct Exposure Residential	GA Leachability Criteria
7440-39-3	Barium	1,500 N	120	5,500	23 ⁽¹²⁾
7440-41-7	Beryllium	16 N	13	1.5	0.03 ⁽¹²⁾
7440-43-9	Cadmium	7 N	0.52	39	0.03 ⁽¹²⁾
7440-70-2	Calcium	NA	NA	NA	NA
7440-47-3	Chromium	0.29 C ⁽⁸⁾	0.00059 ⁽⁸⁾	390 ⁽⁸⁾	1.1 ⁽¹²⁾
7440-48-4	Cobalt	2.3 N	0.21	NA	NA
7440-50-8	Copper	310 N	22	3,100	NA
7439-89-6	Iron	5,500 N	270	NA	NA
7439-92-1	Lead	400	14 ⁽⁹⁾	150	0.04 ⁽¹²⁾
7439-95-4	Magnesium	NA	NA	NA	NA
7439-96-5	Manganese	180 N	21	390	NA
7439-97-6	Mercury	2.3 N ⁽¹⁰⁾	0.033	23	0.02 ⁽¹²⁾
7440-02-0	Nickel	150 N	20	1,000	1 ⁽¹²⁾
7440-09-7	Potassium	NA	NA	NA	NA
7782-49-2	Selenium	39 N	0.4	390	0.6 ⁽¹²⁾
7440-22-4	Silver	39 N	0.6	200	NA
7440-23-5	Sodium	NA	NA	NA	NA
7440-62-2	Vanadium	39 N	78	550	NA
7440-66-6	Zinc	2,300 N	290	6,000	NA
Miscellaneous Parameters (ug/kg)					
1002-53-5	Dibutyltin	1800 N	NA	NA	NA
78763-54-9	Monobutyltin	1800 N ⁽¹³⁾	NA	NA	NA
1461-25-2	Tetrabutyltin	1800 N ⁽¹³⁾	NA	NA	NA
56573-85-4	Tributyltin	1800 N	NA	NA	NA
Petroleum Hydrocarbons (mg/kg)					
--	Diesel Range Organics	NA	NA	NA	NA
--	Gasoline Range Organics	NA	NA	NA	NA
8001-58-9	Creosote	NA	NA	NA	NA
--	Total Petroleum Hydrocarbons	NA	NA	500	500

1 - USEPA Regional Screening Level, May 2012. Carcinogenic values represent an incremental cancer risk of 1E-06. The noncarcinogenic values are the RSL divided by 10 to correspond to a Target Hazard Quotient of 0.1. Protection of groundwater values are risk-based SSLs.

2 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.

3 - Value is for m-xylene.

4 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.

5 - Value is for acenaphthene.

6 - Value is for pyrene.

7 - Value is for chlordane.

8 - Value is for hexavalent chromium.

9 - Value is MCL based soil screening level.

10 - Value is for mercuric chloride (and other mercury salts).

11 - Value is for total xylenes.

12 - Leachability criteria for inorganics are based on SPLP/TCLP analysis and are in units of mg/L.

13 - Value is for dibutyltin and tributyltin.

14 - A SSL is not available for mercuric chloride therefore the value for elemental mercury is presented.

N - Noncarcinogenic

C - Carcinogenic

NA - Not Available.

TABLE 5-2
SCREENING CRITERIA FOR GROUNDWATER
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

CAS No.	Parameter	USEPA Regional Screening Level ⁽¹⁾ Tap Water	USEPA MCL ⁽²⁾	RIDEM GA Groundwater Objective ⁽³⁾	USEPA Groundwater Volatilization Criteria ⁽⁴⁾
Volatile Organic Compounds (ug/L)					
75-35-4	1,1-Dichloroethene	26 N	7	7	20 N
67-64-1	Acetone	1,200 N	NA	NA	2,300,000 N
156-59-2	cis-1,2-Dichloroethene	2.8 N	70	70	NA
127-18-4	Tetrachloroethene	3.5 N ⁽⁵⁾	5	5	5.8 N ⁽⁵⁾
540-59-0	Total 1,2-Dichloroethene	13 N	NA	NA	NA
156-60-5	trans-1,2-Dichloroethene	8.6 N	100	100	38 N
79-01-6	Trichloroethene	0.26 N ⁽⁵⁾	5	5	0.52 N ⁽⁵⁾
75-69-4	Trichlorofluoromethane	110 N	NA	NA	18 N
75-01-4	Vinyl Chloride	0.015 C	2	2	0.14 C
Metals (ug/L)					
7429-90-5	Aluminum	1,600 N	50 - 200 ⁽⁶⁾	NA	NA
7440-38-2	Arsenic	0.045 C	10	10	NA
7440-39-3	Barium	290 N	2,000	2000	NA
7440-43-9	Cadmium	0.69 N	5	5	NA
7440-70-2	Calcium	NA	NA	NA	NA
7440-47-3	Chromium	0.031 C	100 ⁽⁷⁾	100 ⁽⁸⁾	NA
7440-48-4	Cobalt	0.47 N	NA	NA	NA
7440-50-8	Copper	62 N	1,300 ⁽⁹⁾	NA	NA
7439-89-6	Iron	1,100 N	300 ⁽⁹⁾	NA	NA
7439-92-1	Lead	NA	15 ⁽⁹⁾	15	NA
7439-95-4	Magnesium	NA	NA	NA	NA
7439-96-5	Manganese	32 N	50 ⁽⁶⁾	NA	NA
7440-02-0	Nickel	30 N	NA	100	NA
7440-09-7	Potassium	NA	NA	NA	NA
7782-49-2	Selenium	7.8 N	50	50	NA
7440-23-5	Sodium	NA	NA	NA	NA
7440-66-6	Zinc	470 N	5,000 ⁽⁶⁾	NA	NA

Notes:

- 1 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May, 2012. [Cancer benchmark value = 1E-06, Hazard index (HI) = 0.1].
 - 2 - 2012 Edition of the Drinking Water Standards and Health Advisories (USEPA, April 2012).
 - 3 - RIDEM, DEM-DSR-01-93, November 2011.
 - 4 - USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs. Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
 - 5 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
 - 6 - Secondary Drinking Water Regulation (USEPA, April 2012).
 - 7- Value is for hexavalent chromium.
 - 8 - Value is for total chromium.
 - 9 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
- NVT = Not sufficiently volatile and/or toxic to pose inhalation risk.
NA = Not available.

TABLE 5-3
SCREENING CRITERIA FOR SOIL GAS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RI

CAS No.	Parameter	Soil Gas Screening Level ⁽¹⁾
Volatile Organic Compounds (ug/m³)		
71-55-6	1,1,1-Trichloroethane	5,200 N
76-13-1	1,1,2-Trichlorotrifluoroethane	31,000 N
75-34-3	1,1-Dichloroethane	15 C
95-63-6	1,2,4-Trimethylbenzene	7.3 N
108-67-8	1,3,5-Trimethylbenzene	7.3 N ⁽⁴⁾
106-99-0	1,3-Butadiene	0.81 C
622-96-8	1-Ethyl-4-Methyl Benzene	NA
78-93-3	2-Butanone	5,200 N
591-78-6	2-Hexanone	31 N
108-10-1	4-Methyl-2-Pentanone	3,100 N
107-13-1	Acrylonitrile	0.36 C
71-43-2	Benzene	3.1 C
108-90-7	Chlorobenzene	52 N
75-00-3	Chloroethane	10,000 N
67-66-3	Chloroform	1.1 C
74-87-3	Chloromethane	94 N
156-59-2	cis-1,2-Dichloroethene	63 N ⁽⁵⁾
110-82-7	Cyclohexane	6,300 N
75-71-8	Dichlorodifluoromethane	100 N
100-41-4	Ethylbenzene	9.7 C
110-54-3	Hexane	730 N
- -	m+p-Xylenes	100 N ⁽²⁾
1634-04-4	Methyl Tert-Butyl Ether	94 C
75-09-2	Methylene Chloride	630 N ⁽³⁾
142-82-5	n-Heptane	NA
95-47-6	o-Xylene	100 N
100-42-5	Styrene	1,000 N
127-18-4	Tetrachloroethene	42 N ⁽³⁾
108-88-3	Toluene	5,200 N
540-59-0	Total 1,2-Dichloroethene	63 N ⁽⁵⁾
1330-20-7	Total Xylenes	100 N
156-60-5	Trans-1,2-Dichloroethene	63 N
79-01-6	Trichloroethene	2.1 N ⁽³⁾
75-69-4	Trichlorofluoromethane	730 N
75-01-4	Vinyl Chloride	1.6 C

1 - USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.

2 - Value is for m-xylene.

3 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.

4 - Value is for 1,2,4-trimethylbenzene.

5 - Value is for trans-1,2-dichloroethene.

N - Noncarcinogenic

C - Carcinogenic

TABLE 5-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 3

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Volatile Organic Compounds													
78-93-3	2-Butanone	3.01 J	3.26 J	ug/kg	DSY-SB204-SO-0002-D	1/19	3.92 - 12	3.26	NA	2,800,000 N	10,000,000	No	BSL
591-78-6	2-Hexanone	3.17 J	4.96 J	ug/kg	DSY-SB204-SO-0002-D	1/19	1.96 - 12	4.96	NA	21,000 N	NA	No	BSL
67-64-1	Acetone	9.96 J	120	ug/kg	DSY-S-TP18-0001-D	10/19	10 - 41	120	NA	6,100,000 N	7,800,000	No	BSL
71-43-2	Benzene	1 J	1 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	1	NA	1,100 C	2,500	No	BSL
75-15-0	Carbon Disulfide	3.28 J	3.28 J	ug/kg	DSY-SB205-SO-0002	1/19	1.96 - 12	3.28	NA	82,000 N	NA	No	BSL
108-90-7	Chlorobenzene	3 J	3 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	3	NA	29,000 N	210,000	No	BSL
108-88-3	Toluene	1 J	4 J	ug/kg	DSY-S-TP23-0001	6/19	1.96 - 11	4	NA	500,000 N	190,000	No	BSL
1330-20-7	Total Xylenes	1 J	2 J	ug/kg	DSY-S-TP23-0001	2/19	5.88 - 12	2	NA	63,000 N	110,000	No	BSL
79-01-6	Trichloroethene	2 J	2 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	2	NA	440 N ⁽⁸⁾	13,000	No	BSL
Semivolatile Organic Compounds													
108-60-1	2,2'-Oxybis(1-Chloropropane)	39 J	39 J	ug/kg	DSY-S-TP18-0001-D	1/15	330 - 12000	39	NA	4,600 C	NA	No	BSL
91-57-6	2-Methylnaphthalene	14.5 J	14.5 J	ug/kg	DSY-SB207-SO-0002	1/19	3.56 - 12000	14.5	NA	23,000 N	123,000	No	BSL
83-32-9	Acenaphthene	17.8 J	17.8 J	ug/kg	DSY-SB205-SO-0002	2/19	3.56 - 12000	17.8	NA	340,000 N	43,000	No	BSL
208-96-8	Acenaphthylene	19.9 J	19.9 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	19.9	NA	340,000 N ⁽⁹⁾	23,000	No	BSL
120-12-7	Anthracene	51.1	51.1	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	51.1	NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	15.7 J	710 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	710	NA	150 C	900	Yes	ASL
50-32-8	Benzo(a)pyrene	11.7 J	680 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	680	NA	15 C	400	Yes	ASL
205-99-2	Benzo(b)fluoranthene	15.5 J	1,000 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,000	NA	150 C	900	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	1.92 J	119	ug/kg	DSY-SB205-SO-0002	4/19	17.9 - 12000	119	NA	170,000 N ⁽¹⁰⁾	800	No	BSL
207-08-9	Benzo(k)fluoranthene	15.8 J	92.4	ug/kg	DSY-SB205-SO-0002	3/19	3.56 - 12000	92.4	NA	1,500 C	900	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	44 J	150 J	ug/kg	DSY-S-TP18-0001	8/15	330 - 12000	150	NA	35,000 C	46,000	No	BSL
218-01-9	Chrysene	16.5 J	690 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	690	NA	15,000 C	400	Yes	ASL
53-70-3	Dibenzo(a,h)anthracene	124	124	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	124	NA	15 C	400	Yes	ASL
206-44-0	Fluoranthene	20 J	1,400 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,400	NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	21.7 J	21.7 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	21.7	NA	230,000 N	28,000	No	BSL
67-72-1	Hexachloroethane	55 J	55 J	ug/kg	DSY-S-TP20-0001	1/15	330 - 12000	55	NA	4,300 N ⁽⁸⁾	46,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	12 J	520 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	520	NA	150 C	900	Yes	ASL
91-20-3	Naphthalene	18.4 J	18.4 J	ug/kg	DSY-SB207-SO-0002	1/19	3.56 - 12000	18.4	NA	3,600 C	54,000	No	BSL
85-01-8	Phenanthrene	11.3 J	730 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	730	NA	170,000 N ⁽¹⁰⁾	40,000	No	BSL
108-95-2	Phenol	170 J	170 J	ug/kg	DSY-S-TP18-0001	1/15	330 - 12000	170	NA	1,800,000 N	6,000,000	No	BSL
129-00-0	Pyrene	3.05 J	1,400 J	ug/kg	DSY-S-TP16-0001	6/19	17.9 - 410	1,400	NA	170,000 N	13,000	No	BSL
Pesticides/PCBs													
72-55-9	4,4'-DDE	22	22	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	22	NA	1,400 C	NA	No	BSL
50-29-3	4,4'-DDT	56	56	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	56	NA	1,700 C	NA	No	BSL
5103-71-9	alpha-Chlordane	2	7.3	ug/kg	DSY-S-TP28-0001	2/15	1.7 - 2.1	7.3	NA	1,600 C ⁽¹¹⁾	NA	No	BSL
11096-82-5	Aroclor-1260	24 J	24 J	ug/kg	DSY-S-TP16-0001	1/15	32 - 41	24	NA	220 C	NA	No	BSL
60-57-1	Dieldrin	16	16	ug/kg	DSY-S-TP16-0001	1/15	3.2 - 4.1	16	NA	30 C	40	No	BSL
72-20-8	Endrin	5.7	26	ug/kg	DSY-S-TP16-0001	2/15	3.2 - 3.6	26	NA	1,800 N	NA	No	BSL
5103-74-2	gamma-Chlordane	2.4	2.4	ug/kg	DSY-S-MW03-0_501	2/15	1.7 - 2.1	2.4	NA	1,600 C ⁽¹¹⁾	NA	No	BSL
1024-57-3	Heptachlor Epoxide	4.2	4.2	ug/kg	DSY-S-TP28-0001	1/15	1.7 - 2.1	4.2	NA	53 C	NA	No	BSL

TABLE 5-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 3

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Metals													
7429-90-5	Aluminum	3,440 J	9,650	mg/kg	DSY-SB205-SO-0002	19/19	-	9,650	16,020	7,700 N	NA	No	BKG
7440-38-2	Arsenic	2.41	10.9 J	mg/kg	DSY-S-TP28-0001	17/19	2.9 - 3.3	10.9	13	0.39 C	7	No	BKG
7440-39-3	Barium	5.1	49.4	mg/kg	DSY-S-TP16-0001	18/19	4.1 - 4.1	49.4	51	1,500 N	5,500	No	BSL, BKG
7440-41-7	Beryllium	0.18 J	1.1	mg/kg	DSY-S-TP16-0001	10/19	0.15 - 0.21	1.1	0.58	16 N	1.5	No	BSL
7440-43-9	Cadmium	0.85 J	0.85 J	mg/kg	DSY-S-TP16-0001	1/19	0.109 - 0.64	0.85	0.17	7 N	39	No	BSL
7440-70-2	Calcium	237	2,290	mg/kg	DSY-SB205-SO-0002	18/19	91.1 - 91.1	2,290	1,598	NA	NA	No	NUT
7440-47-3	Chromium	5.2	24.1	mg/kg	DSY-S-TP16-0001	17/19	6.5 - 6.9	24.1	16	0.29 C ⁽¹²⁾	390 ⁽¹²⁾	Yes	ASL
7440-48-4	Cobalt	2.6	14.7	mg/kg	DSY-S-TP16-0001	17/19	3.5 - 4.6	14.7	9	2.3 N	NA	Yes	ASL
7440-50-8	Copper	3.1	111	mg/kg	DSY-S-TP16-0001	19/19	-	111	12	310 N	3,100	No	BSL
7439-89-6	Iron	11,200 J	27,100	mg/kg	DSY-SB205-SO-0002	19/19	-	27,100	24,200	5,500 N	NA	Yes	ASL
7439-92-1	Lead	2.3 J	115 J	mg/kg	DSY-S-TP28-0001	19/19	-	115	40	400	150	No	BSL
7439-95-4	Magnesium	1,320	2,680	mg/kg	DSY-SB205-SO-0002	19/19	-	2,680	2,571	NA	NA	No	NUT
7439-96-5	Manganese	81.4 J	340 J	mg/kg	DSY-S-TP23-0001	19/19	-	340	349	180 N	390	No	BKG
7439-97-6	Mercury	0.0204 J	0.06	mg/kg	DSY-S-MW03-0_501	4/19	0.0292 - 0.17	0.06	0.18	2.3 N ⁽¹³⁾	23	No	BSL, BKG
7440-02-0	Nickel	8.2 J	68.5	mg/kg	DSY-S-TP16-0001	13/19	9.3 - 14.4	68.5	15	150 N	1,000	No	BSL
7440-09-7	Potassium	198	639 J	mg/kg	DSY-SB206-SO-0002	19/19	-	639	651	NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.63 J	1 J	mg/kg	DSY-S-MW12-SS01	6/17	0.273 - 0.85	1	0.57	39 N	390	No	BSL
7440-23-5	Sodium	19.7 J	172	mg/kg	DSY-S-TP16-0001	7/19	11.7 - 343	172	231	NA	NA	No	NUT, BKG
7440-62-2	Vanadium	6.4	39	mg/kg	DSY-S-TP28-0001	19/19	-	39	34	39 N	550	No	BSL
7440-66-6	Zinc	22.8	883	mg/kg	DSY-S-TP16-0001	19/19	-	883	62	2,300 N	6,000	No	BSL
Miscellaneous Parameters													
1002-53-5	Dibutyltin	5.2 J	33	ug/kg	DSY-S-TP16-0001	2/15	49 - 50	33	NA	1,800 N	NA	No	BSL
78763-54-9	Monobutyltin	33	33	ug/kg	DSY-S-TP16-0001	1/15	49 - 50	33	NA	1,800 N ⁽¹⁴⁾	NA	No	BSL
1461-25-2	Tetrabutyltin	2.5 J	5.8 J	ug/kg	DSY-S-TP22-0001	4/15	49 - 50	5.8	NA	1,800 N ⁽¹⁴⁾	NA	No	BSL
56573-85-4	Tributyltin	3.6 J	30 J	ug/kg	DSY-S-TP16-0001	3/15	49 - 50	30	NA	1,800 N	NA	No	BSL

TABLE 5-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
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Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 - Value is for acenaphthene.
- 10 - Value is for pyrene.
- 11 - Value is for chlordane.
- 12 - Value is for hexavalent chromium.
- 13 - Value is for mercuric chloride (and other mercury salts).
- 14 - Value is for dibutyltin and tributyltin.

Definitions:

- C = Carcinogen
- COPC = Chemical Of Potential Concern
- J = Estimated value
- N = Noncarcinogen
- NA = Not Applicable/Not Available

Rationale Codes:

- For selection as a COPC:
- ASL = Above Screening Level.

- For elimination as a COPC:
- BKG = Within Background Levels
- BSL = Below COPC Screening Level
- NTX = No toxicity criteria
- NUT = Essential nutrient

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

- DSY-S-MW02-SS01
- DSY-S-MW03-0_501
- DSY-S-MW04-SS01
- DSY-S-MW11-0001
- DSY-S-MW12-SS01
- DSY-SB-11-0002
- DSY-SB204-SO-0002
- DSY-SB204-SO-0002-D
- DSY-SB205-SO-0002
- DSY-SB206-SO-0002
- DSY-SB207-SO-0002
- DSY-S-TP16-0001
- DSY-S-TP18-0001
- DSY-S-TP18-0001-D
- DSY-S-TP19-0001
- DSY-S-TP20-0001
- DSY-S-TP21-0001
- DSY-S-TP22-0001
- DSY-S-TP23-0001
- DSY-S-TP27-0001
- DSY-S-TP28-0001

TABLE 5-5
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Volatile Organic Compounds												
78-93-3	2-Butanone	3.26 J	3.26 J	ug/kg	DSY-SB204-SO-0002-D	1/19	3.92 - 12	3.26	NA	1,000	NA	No
591-78-6	2-Hexanone	4.96 J	4.96 J	ug/kg	DSY-SB204-SO-0002-D	1/19	1.96 - 12	4.96	NA	7.9	NA	No
67-64-1	Acetone	9.96 J	120	ug/kg	DSY-S-TP18-0001-D	10/19	10 - 41	120	NA	2,400	NA	No
71-43-2	Benzene	1 J	1 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	1	NA	0.2	200	Yes
75-15-0	Carbon Disulfide	3.28 J	3.28 J	ug/kg	DSY-SB205-SO-0002	1/19	1.96 - 12	3.28	NA	210	NA	No
108-90-7	Chlorobenzene	3 J	3 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	3	NA	49	3,200	No
108-88-3	Toluene	1 J	4 J	ug/kg	DSY-S-TP23-0001	6/19	1.96 - 11	4	NA	590	32,000	No
1330-20-7	Total Xylenes	1 J	2 J	ug/kg	DSY-S-TP23-0001	2/19	5.88 - 12	2	NA	190	540,000	No
79-01-6	Trichloroethene	2 J	2 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	2	NA	0.16	200	Yes
Semivolatile Organic Compounds												
108-60-1	2,2'-Oxybis(1-Chloropropane)	39 J	39 J	ug/kg	DSY-S-TP18-0001-D	1/15	330 - 12000	39	NA	0.11	NA	Yes
91-57-6	2-Methylnaphthalene	14.5 J	14.5 J	ug/kg	DSY-SB207-SO-0002	1/19	3.56 - 12000	14.5	NA	140	NA	No
83-32-9	Acenaphthene	17.8 J	17.8 J	ug/kg	DSY-SB205-SO-0002	2/19	3.56 - 12000	17.8	NA	4,100	NA	No
208-96-8	Acenaphthylene	19.9 J	19.9 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	19.9	NA	4,100 ⁽⁸⁾	NA	No
120-12-7	Anthracene	51.1	51.1	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	51.1	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	15.7 J	710 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	710	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	11.7 J	680 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	680	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	15.5 J	1,000 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,000	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	1.92 J	119	ug/kg	DSY-SB205-SO-0002	4/19	17.9 - 12000	119	NA	9,500 ⁽⁹⁾	NA	No
207-08-9	Benzo(k)fluoranthene	15.8 J	92.4	ug/kg	DSY-SB205-SO-0002	3/19	3.56 - 12000	92.4	NA	350	NA	No
117-81-7	Bis(2-ethylhexyl)phthalate	44 J	150 J	ug/kg	DSY-S-TP18-0001	8/15	330 - 12000	150	NA	17	120,000	Yes
218-01-9	Chrysene	16.5 J	690 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	690	NA	1,100	NA	No
53-70-3	Dibenzo(a,h)anthracene	124	124	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	124	NA	11	NA	Yes
206-44-0	Fluoranthene	20 J	1,400 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,400	NA	70,000	NA	No
86-73-7	Fluorene	21.7 J	21.7 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	21.7	NA	4,000	NA	No
67-72-1	Hexachloroethane	55 J	55 J	ug/kg	DSY-S-TP20-0001	1/15	330 - 12000	55	NA	0.48	NA	Yes
193-39-5	Indeno(1,2,3-cd)pyrene	12 J	520 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	520	NA	120	NA	Yes
91-20-3	Naphthalene	18.4 J	18.4 J	ug/kg	DSY-SB207-SO-0002	1/19	3.56 - 12000	18.4	NA	0.47	800	Yes
85-01-8	Phenanthrene	11.3 J	730 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	730	NA	9,500 ⁽⁹⁾	NA	No
108-95-2	Phenol	170 J	170 J	ug/kg	DSY-S-TP18-0001	1/15	330 - 12000	170	NA	2,600	NA	No
129-00-0	Pyrene	3.05 J	1,400 J	ug/kg	DSY-S-TP16-0001	6/19	17.9 - 410	1,400	NA	9,500	NA	No
Pesticides/PCBs												
72-55-9	4,4'-DDE	22	22	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	22	NA	46	NA	No
50-29-3	4,4'-DDT	56	56	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	56	NA	67	NA	No
5103-71-9	alpha-Chlordane	2	7.3	ug/kg	DSY-S-TP28-0001	2/15	1.7 - 2.1	7.3	NA	1.8 ⁽¹⁰⁾	NA	Yes
11096-82-5	Aroclor-1260	24 J	24 J	ug/kg	DSY-S-TP16-0001	1/15	32 - 41	24	NA	24	NA	No
60-57-1	Dieldrin	16	16	ug/kg	DSY-S-TP16-0001	1/15	3.2 - 4.1	16	NA	0.061	NA	Yes
72-20-8	Endrin	5.7	26	ug/kg	DSY-S-TP16-0001	2/15	3.2 - 3.6	26	NA	68	NA	No
5103-74-2	gamma-Chlordane	2.4	2.4	ug/kg	DSY-S-MW03-0_501	2/15	1.7 - 2.1	2.4	NA	1.8 ⁽¹⁰⁾	NA	Yes
1024-57-3	Heptachlor Epoxide	4.2	4.2	ug/kg	DSY-S-TP28-0001	1/15	1.7 - 2.1	4.2	NA	0.068	NA	Yes

TABLE 5-5
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Metals												
7429-90-5	Aluminum	3,440 J	10,200	mg/kg	DSY-S-TP28-0001-D	19/19	-	10,200	16,020	23,000	NA	No
7440-38-2	Arsenic	2.41	10.9 J	mg/kg	DSY-S-TP28-0001	17/19	2.9 - 3.3	10.9	13	0.0013	NA	No
7440-39-3	Barium	5.1	49.4	mg/kg	DSY-S-TP16-0001	18/19	4.1 - 4.1	49.4	51	120	NA	No
Metals (Continued)												
7440-41-7	Beryllium	0.18 J	1.1	mg/kg	DSY-S-TP16-0001	10/19	0.15 - 0.21	1.1	0.58	13	NA	No
7440-43-9	Cadmium	0.85 J	0.85 J	mg/kg	DSY-S-TP16-0001	1/19	0.109 - 0.64	0.85	0.17	0.52	NA	Yes
7440-70-2	Calcium	237	2,290	mg/kg	DSY-SB205-SO-0002	18/19	91.1 - 91.1	2,290	1,598	NA	NA	No
7440-47-3	Chromium	5.2	24.1	mg/kg	DSY-S-TP16-0001	17/19	6.5 - 6.9	24.1	16	0.00059 ⁽¹¹⁾	NA	Yes
7440-48-4	Cobalt	2.6	14.7	mg/kg	DSY-S-TP16-0001	17/19	3.5 - 4.6	14.7	9	0.21	NA	Yes
7440-50-8	Copper	3.1	111	mg/kg	DSY-S-TP16-0001	19/19	-	111	12	22	NA	Yes
7439-89-6	Iron	11,200 J	27,100	mg/kg	DSY-SB205-SO-0002	19/19	-	27,100	24,200	270	NA	Yes
7439-92-1	Lead	2.3 J	115 J	mg/kg	DSY-S-TP28-0001	19/19	-	115	40	14 ⁽¹²⁾	NA	Yes
7439-95-4	Magnesium	1,320	2,680	mg/kg	DSY-SB205-SO-0002	19/19	-	2,680	2,571	NA	NA	No
7439-96-5	Manganese	81.4 J	349 J	mg/kg	DSY-S-TP28-0001-D	19/19	-	349	349	21	NA	No
7439-97-6	Mercury	0.0204 J	0.06	mg/kg	DSY-S-MW03-0_501	4/19	0.0292 - 0.17	0.06	0.18	0.033	NA	No
7440-02-0	Nickel	8.2 J	68.5	mg/kg	DSY-S-TP16-0001	13/19	9.3 - 14.4	68.5	15	20	NA	Yes
7440-09-7	Potassium	198	639 J	mg/kg	DSY-SB206-SO-0002	19/19	-	639	651	NA	NA	No
7782-49-2	Selenium	0.63 J	1 J	mg/kg	DSY-S-MW12-SS01	6/17	0.273 - 0.85	1	0.57	0.4	NA	Yes
7440-23-5	Sodium	19.7 J	172	mg/kg	DSY-S-TP16-0001	7/19	11.7 - 343	172	231	NA	NA	No
7440-62-2	Vanadium	6.4	40	mg/kg	DSY-S-TP28-0001-D	19/19	-	40	34	78	NA	No
7440-66-6	Zinc	22.8	883	mg/kg	DSY-S-TP16-0001	19/19	-	883	62	290	NA	Yes
Miscellaneous Parameters												
1002-53-5	Dibutyltin	5.2 J	33	ug/kg	DSY-S-TP16-0001	2/15	49 - 50	33	NA	NA	NA	No
78763-54-9	Monobutyltin	33	33	ug/kg	DSY-S-TP16-0001	1/15	49 - 50	33	NA	NA	NA	No
1461-25-2	Tetrabutyltin	2.5 J	5.8 J	ug/kg	DSY-S-TP22-0001	4/15	49 - 50	5.8	NA	NA	NA	No
56573-85-4	Tributyltin	3.6 J	30 J	ug/kg	DSY-S-TP16-0001	3/15	49 - 50	30	NA	NA	NA	No
TCLP Metals												
7440-38-2	Arsenic	4.4 J	4.4 J	ug/L	DSY-SB-11-0002	1/14	4 - 6.2	4.4	NA	NA	NA	No
7440-39-3	Barium	167	609	ug/L	DSY-S-MW02-SS01	7/14	41.3 - 719	609	NA	NA	23,000	No
7440-47-3	Chromium	10.6 J	40.5 J	ug/L	DSY-SB-11-0002	2/14	6 - 12	40.5	NA	NA	1,100	No
7439-92-1	Lead	5.7	71.9	ug/L	DSY-S-TP28-0001	4/14	1 - 5.7	71.9	NA	NA	40	Yes

TABLE 5-5
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
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Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background concentration is upper prediction limit. See Appendix G.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - Value is for acenaphthene.
9 - Value is for pyrene.
10 - Value is for chlordane.
11 - Value is for hexavalent chromium.
12 - Value is MCL based soil screening level.

Definitions:
C = Carcinogen
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

- Associated Samples**
DSY-S-MW02-SS01
DSY-S-MW03-0_501
DSY-S-MW04-SS01
DSY-S-MW11-0001
DSY-S-MW12-SS01
DSY-SB-11-0002
DSY-SB204-SO-0002
DSY-SB204-SO-0002-D
DSY-SB205-SO-0002
DSY-SB206-SO-0002
DSY-SB207-SO-0002
DSY-S-TP16-0001
DSY-S-TP18-0001
DSY-S-TP18-0001-D
DSY-S-TP19-0001
DSY-S-TP20-0001
DSY-S-TP21-0001
DSY-S-TP22-0001
DSY-S-TP23-0001
DSY-S-TP27-0001
DSY-S-TP28-0001
DSY-S-TP28-0001-D

TABLE 5-6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 3

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Volatile Organic Compounds													
78-93-3	2-Butanone	14	14	ug/kg	DSY-S-TP24-0102	1/21	4.32 - 110	14	NA	2,800,000 N	10,000,000	No	BSL
67-64-1	Acetone	16	240	ug/kg	DSY-S-MW11-2931	3/21	8.63 - 270	240	NA	6,100,000 N	7,800,000	No	BSL
75-15-0	Carbon Disulfide	2 J	2.6 J	ug/kg	DSY-SB205-SO-088.5	2/21	2.16 - 110	2.6	NA	82,000 N	NA	No	BSL
108-88-3	Toluene	2 J	2 J	ug/kg	DSY-S-TP24-0102	1/21	2.16 - 110	2	NA	500,000 N	190,000	No	BSL
540-59-0	Total 1,2-Dichloroethene	1 J	5 J	ug/kg	DSY-S-MW11-2931-D	1/21	2.16 - 110	5	NA	70,000 N	630,000	No	BSL
1330-20-7	Total Xylenes	2 J	2 J	ug/kg	DSY-S-MW11-0103, DSY-S-TP24-0102	2/21	6.47 - 110	2	NA	63,000 N	110,000	No	BSL
79-01-6	Trichloroethene	1 J	4 J	ug/kg	DSY-S-MW11-2931, DSY-S-MW11-2931-D	4/21	2.16 - 110	4	NA	440 N ⁽⁸⁾	13,000	No	BSL
Semivolatile Organic Compounds													
83-32-9	Acenaphthene	3.62 J	3.62 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.62	NA	340,000 N	43,000	No	BSL
208-96-8	Acenaphthylene	3.53 J	3.53 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.53	NA	340,000 N ⁽⁹⁾	23,000	No	BSL
120-12-7	Anthracene	8	8	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	8	NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	27 J	53 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	53	NA	150 C	900	No	BSL
50-32-8	Benzo(a)pyrene	23.3	44 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA	15 C	400	Yes	ASL
205-99-2	Benzo(b)fluoranthene	2.65 J	71 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	71	NA	150 C	900	No	BSL
191-24-2	Benzo(g,h,i)perylene	2.51 J	21.6	ug/kg	DSY-SB205-SO-088.5	2/21	3.42 - 11000	21.6	NA	170,000 N ⁽¹⁰⁾	800	No	BSL
207-08-9	Benzo(k)fluoranthene	11.2	11.2	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	11.2	NA	1,500 C	900	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	43 J	97 J	ug/kg	DSY-S-TP24-0102	5/17	330 - 11000	97	NA	35,000 C	46,000	No	BSL
218-01-9	Chrysene	32.1	44 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA	15,000 C	400	No	BSL
53-70-3	Dibenzo(a,h)anthracene	23.3	23.3	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	23.3	NA	15 C	400	Yes	ASL
84-74-2	di-n-Butyl Phthalate	42 J	270 J	ug/kg	DSY-S-MW04-1618	3/17	330 - 11000	270	NA	610,000 N	NA	No	BSL
206-44-0	Fluoranthene	2.19 J	81 J	ug/kg	DSY-S-TP24-0102-D	4/21	3.42 - 11000	81	NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	2.93 J	2.93 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	2.93	NA	230,000 N	28,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	18	18	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	18	NA	150 C	900	No	BSL
91-20-3	Naphthalene	3.54 J	3.54 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.54	NA	3,600 C	54,000	No	BSL
85-01-8	Phenanthrene	2.1 J	54 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	54	NA	170,000 N ⁽¹⁰⁾	40,000	No	BSL
129-00-0	Pyrene	2.05 J	1,600 J	ug/kg	DSY-S-TP16-1112	4/21	3.42 - 420	1,600	NA	170,000 N	13,000	No	BSL
Pesticides/PCBs													
309-00-2	Aldrin	4.4 J	4.4 J	ug/kg	DSY-S-TP16-1112	1/17	1.7 - 2.2	4.4	NA	29 C	NA	No	BSL
5103-71-9	alpha-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA	1,600 C ⁽¹¹⁾	NA	No	BSL
72-20-8	Endrin	15	15	ug/kg	DSY-S-TP16-1112	1/15	3.4 - 3.9	15	NA	1,800 N	NA	No	BSL
5103-74-2	gamma-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA	1,600 C ⁽¹¹⁾	NA	No	BSL
76-44-8	Heptachlor	2.4	3.8	ug/kg	DSY-S-MW02-2426	4/17	1.7 - 2.2	3.8	NA	110 C	NA	No	BSL
Metals													
7429-90-5	Aluminum	2,430 J	18,200	mg/kg	DSY-S-MW02-3436	39/39	-	18,200	13075	7,700 N	NA	Yes	ASL
7440-38-2	Arsenic	2.7 J	16.6	mg/kg	DSY-S-TP16-1112	37/39	4.1 - 4.7	16.6	20	0.39 C	7	No	BKG
7440-39-3	Barium	3.2	26.2 J	mg/kg	DSY-S-TP28-1314	26/39	2.1 - 6	26.2	36	1,500 N	5,500	No	BSL, BKG
7440-41-7	Beryllium	0.176 J	0.35 J	mg/kg	DSY-S-TP22-1112, DSY-S-TP28-0507, DSY-S-TP28-1314	22/39	0.18 - 0.26	0.35	0.64	16 N	1.5	No	BSL, BKG
7440-43-9	Cadmium	0.65 J	0.65 J	mg/kg	DSY-S-TP22-1112	1/39	0.106 - 1.1	0.65	0.23	7 N	39	No	BSL
7440-70-2	Calcium	305	3,480	mg/kg	DSY-S-MW02-1820	39/39	-	3,480	1689	NA	NA	No	NUT

TABLE 5-6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Metals (Continued)													
7440-47-3	Chromium	2.2 J	27.1 J	mg/kg	DSY-S-MW02-3436	37/39	6 - 7.8	27.1	18	0.29 C ⁽¹²⁾	390 ⁽¹²⁾	Yes	ASL
7440-48-4	Cobalt	3 J	19.8	mg/kg	DSY-S-MW02-3436	33/39	2.6 - 3.2	19.8	17	2.3 N	NA	Yes	ASL
7440-50-8	Copper	4.1 J	30.9	mg/kg	DSY-S-MW02-3436	36/39	4.1 - 5	30.9	24	310 N	3,100	No	BSL
7439-89-6	Iron	6,970	44,400 J	mg/kg	DSY-S-MW11-2931	39/39	-	44,400	39173	5,500 N	NA	Yes	ASL
7439-92-1	Lead	1.6 J	29.2	mg/kg	DSY-S-MW03-1618	38/39	1.7 - 1.7	29.2	12	400	150	No	BSL
7439-95-4	Magnesium	921	7,680	mg/kg	DSY-S-MW02-3436	39/39	-	7,680	3811	NA	NA	No	NUT
7439-96-5	Manganese	55.4	549 J	mg/kg	DSY-S-TP22-1112	39/39	-	549	1037	180 N	390	No	BKG
7439-97-6	Mercury	0.0125 J	0.31	mg/kg	DSY-S-MW11-2931	4/39	0.03 - 0.18	0.31	0.012	2.3 N ⁽¹³⁾	23	No	BSL
7440-02-0	Nickel	5.1	39.5	mg/kg	DSY-S-MW02-3436	37/39	14.1 - 15.7	39.5	28	150 N	1,000	No	BSL
7440-09-7	Potassium	132	1,190	mg/kg	DSY-S-MW12-SS12	39/39	-	1,190	1700	NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.16 J	1.3 J	mg/kg	DSY-S-MW12-SS16	9/36	0.269 - 1	1.3	0.29	39 N	390	No	BSL
7440-23-5	Sodium	23	117	mg/kg	DSY-S-TP20-1011	3/38	16.8 - 330	117	83	NA	NA	No	NUT
7440-62-2	Vanadium	4.3	23.9 J	mg/kg	DSY-S-MW11-2931	39/39	-	23.9	23	39 N	550	No	BSL
7440-66-6	Zinc	13.6 J	74.9	mg/kg	DSY-S-MW11-2931	39/39	-	74.9	66	2,300 N	6,000	No	BSL
Miscellaneous Parameters													
1461-25-2	Tetrabutyltin	3.3 J	8.5 J	ug/kg	DSY-S-TP24-0102-D	3/17	49 - 50	8.5	NA	1,800 N ⁽¹⁴⁾	NA	No	BSL
56573-85-4	Tributyltin	1.4 J	15.1 J	ug/kg	DSY-S-MW11-2931	5/17	49 - 50	15.1	NA	1,800 N	NA	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 - Value is for acenaphthene.
- 10 - Value is for pyrene.
- 11 - Value is for chlordane.
- 12 - Value is for hexavalent chromium.
- 13 - Value is for mercuric chloride (and other mercury salts).
- 14 - Value is for dibutyltin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 5-6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
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Associated Samples

DSY-S-MW02-1820	DSY-S-TP16-1112
DSY-S-MW02-2426	DSY-S-TP18-0507
DSY-S-MW02-3436	DSY-S-TP18-1011
DSY-S-MW03-0810	DSY-S-TP19-0507
DSY-S-MW03-1618	DSY-S-TP19-1011
DSY-S-MW04-0810	DSY-S-TP20-0507
DSY-S-MW04-1618	DSY-S-TP20-1011
DSY-S-MW11-0103	DSY-S-TP21-0507
DSY-S-MW11-1113	DSY-S-TP21-1011
DSY-S-MW11-1113-D	DSY-S-TP22-0506
DSY-S-MW11-2729	DSY-S-TP22-1112
DSY-S-MW11-2931	DSY-S-TP23-0507
DSY-S-MW11-2931-D	DSY-S-TP23-0910
DSY-S-MW12-SS05	DSY-S-TP24-0102
DSY-S-MW12-SS12	DSY-S-TP24-0102-D
DSY-S-MW12-SS16	DSY-S-TP24-0507
DSY-SB204-SO-0810	DSY-S-TP24-1011
DSY-SB205-SO-088.5	DSY-S-TP27-0507
DSY-SB206-SO-0810	DSY-S-TP27-1011
DSY-SB207-SO-1012	DSY-S-TP28-0507
DSY-S-TP16-0506	DSY-S-TP28-1314

TABLE 5-7
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Volatile Organic Compounds												
78-93-3	2-Butanone	14	14	ug/kg	DSY-S-TP24-0102	1/21	4.32 - 110	14	NA	1,000	NA	No
67-64-1	Acetone	16	240	ug/kg	DSY-S-MW11-2931	3/21	8.63 - 270	240	NA	2,400	NA	No
75-15-0	Carbon Disulfide	2 J	2.6 J	ug/kg	DSY-SB205-SO-088.5	2/21	2.16 - 110	2.6	NA	210	NA	No
108-88-3	Toluene	2 J	2 J	ug/kg	DSY-S-TP24-0102	1/21	2.16 - 110	2	NA	590	32,000	No
540-59-0	Total 1,2-Dichloroethene	1 J	5 J	ug/kg	DSY-S-MW11-2931-D	1/21	2.16 - 110	5	NA	37	NA	No
1330-20-7	Total Xylenes	2 J	2 J	ug/kg	DSY-S-MW11-0103, DSY-S-TP24-0102	2/21	6.47 - 110	2	NA	190	540,000	No
79-01-6	Trichloroethene	1 J	4 J	ug/kg	DSY-S-MW11-2931, DSY-S-MW11-2931-D	4/21	2.16 - 110	4	NA	0.16	200	Yes
Semivolatile Organic Compounds												
83-32-9	Acenaphthene	3.62 J	3.62 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.62	NA	4,100	NA	No
208-96-8	Acenaphthylene	3.53 J	3.53 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.53	NA	4,100 ⁽⁸⁾	NA	No
120-12-7	Anthracene	8	8	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	8	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	27 J	53 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	53	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	23.3	44 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	2.65 J	71 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	71	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	2.51 J	21.6	ug/kg	DSY-SB205-SO-088.5	2/21	3.42 - 11000	21.6	NA	9,500 ⁽⁹⁾	NA	No
207-08-9	Benzo(k)fluoranthene	11.2	11.2	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	11.2	NA	350	NA	No
117-81-7	Bis(2-ethylhexyl)phthalate	43 J	97 J	ug/kg	DSY-S-TP24-0102	5/17	330 - 11000	97	NA	17	120,000	Yes
218-01-9	Chrysene	32.1	44 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA	1,100	NA	No
53-70-3	Dibenzo(a,h)anthracene	23.3	23.3	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	23.3	NA	11	NA	Yes
84-74-2	di-n-Butyl Phthalate	42 J	270 J	ug/kg	DSY-S-MW04-1618	3/17	330 - 11000	270	NA	1,700	NA	No
206-44-0	Fluoranthene	2.19 J	81 J	ug/kg	DSY-S-TP24-0102-D	4/21	3.42 - 11000	81	NA	70,000	NA	No
86-73-7	Fluorene	2.93 J	2.93 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	2.93	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	18	18	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	18	NA	120	NA	No
91-20-3	Naphthalene	3.54 J	3.54 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.54	NA	0.47	800	Yes
85-01-8	Phenanthrene	2.1 J	54 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	54	NA	9,500 ⁽⁹⁾	NA	No
129-00-0	Pyrene	2.05 J	1,600 J	ug/kg	DSY-S-TP16-1112	4/21	3.42 - 420	1,600	NA	9,500	NA	No
Pesticides/PCBs												
309-00-2	Aldrin	4.4 J	4.4 J	ug/kg	DSY-S-TP16-1112	1/17	1.7 - 2.2	4.4	NA	0.034	NA	Yes
5103-71-9	alpha-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA	1.8⁽¹⁰⁾	NA	Yes
72-20-8	Endrin	15	15	ug/kg	DSY-S-TP16-1112	1/15	3.4 - 3.9	15	NA	68	NA	No
5103-74-2	gamma-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA	13 ⁽¹⁰⁾	NA	No
76-44-8	Heptachlor	2.4	3.8	ug/kg	DSY-S-MW02-2426	4/17	1.7 - 2.2	3.8	NA	0.14	NA	Yes
Metals												
7429-90-5	Aluminum	2,430 J	18,200	mg/kg	DSY-S-MW02-3436	39/39	-	18,200	13,075	23,000	NA	No
7440-38-2	Arsenic	2.7 J	16.6	mg/kg	DSY-S-TP16-1112	37/39	4.1 - 4.7	16.6	20	0.0013	NA	Yes
7440-39-3	Barium	3.2	26.2 J	mg/kg	DSY-S-TP28-1314	26/39	2.1 - 6	26.2	36	120	NA	No
7440-41-7	Beryllium	0.176 J	0.35 J	mg/kg	DSY-S-TP22-1112, DSY-S-TP28-0507, DSY-S-TP28-1314	22/39	0.18 - 0.26	0.35	0.64	13	NA	No
7440-43-9	Cadmium	0.65 J	0.65 J	mg/kg	DSY-S-TP22-1112	1/39	0.106 - 1.1	0.65	0.23	0.52	NA	Yes

TABLE 5-7
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Metals (Continued)												
7440-70-2	Calcium	305	3,480	mg/kg	DSY-S-MW02-1820	39/39	-	3,480	1,689	NA	NA	No
7440-47-3	Chromium	2.2 J	27.1 J	mg/kg	DSY-S-MW02-3436	37/39	6 - 7.8	27.1	18	0.00059 ⁽¹¹⁾	NA	Yes
7440-48-4	Cobalt	3 J	19.8	mg/kg	DSY-S-MW02-3436	33/39	2.6 - 3.2	19.8	17	0.21	NA	Yes
7440-50-8	Copper	4.1 J	30.9	mg/kg	DSY-S-MW02-3436	36/39	4.1 - 5	30.9	24	22	NA	Yes
7439-89-6	Iron	6,970	44,400 J	mg/kg	DSY-S-MW11-2931	39/39	-	44,400	39,173	270	NA	Yes
7439-92-1	Lead	1.6 J	29.2	mg/kg	DSY-S-MW03-1618	38/39	1.7 - 1.7	29.2	12	14 ⁽¹²⁾	NA	Yes
7439-95-4	Magnesium	921	7,680	mg/kg	DSY-S-MW02-3436	39/39	-	7,680	3,811	NA	NA	No
7439-96-5	Manganese	55.4	549 J	mg/kg	DSY-S-TP22-1112	39/39	-	549	1,037	21	NA	No
7439-97-6	Mercury	0.0125 J	0.31	mg/kg	DSY-S-MW11-2931	4/39	0.03 - 0.18	0.31	0.012	0.033	NA	Yes
7440-02-0	Nickel	5.1	39.5	mg/kg	DSY-S-MW02-3436	37/39	14.1 - 15.7	39.5	28	20	NA	Yes
7440-09-7	Potassium	132	1,190	mg/kg	DSY-S-MW12-SS12	39/39	-	1,190	1,700	NA	NA	No
7782-49-2	Selenium	0.16 J	1.3 J	mg/kg	DSY-S-MW12-SS16	9/36	0.269 - 1	1.3	0.29	0.4	NA	Yes
7440-23-5	Sodium	23	117	mg/kg	DSY-S-TP20-1011	3/38	16.8 - 330	117	83	NA	NA	No
7440-62-2	Vanadium	4.3	23.9 J	mg/kg	DSY-S-MW11-2931	39/39	-	23.9	23	78	NA	No
7440-66-6	Zinc	13.6 J	74.9	mg/kg	DSY-S-MW11-2931	39/39	-	74.9	66	290	NA	No
Miscellaneous Parameters												
1461-25-2	Tetrabutyltin	3.3 J	8.5 J	ug/kg	DSY-S-TP24-0102-D	3/17	49 - 50	8.5	NA	NA	NA	No
56573-85-4	Tributyltin	1.4 J	15.1 J	ug/kg	DSY-S-MW11-2931	5/17	49 - 50	15.1	NA	NA	NA	No
TCLP Metals												
7440-38-2	Arsenic	5.8 J	5.8 J	UG/L)	DSY-S-TP24-0102	1/17	4 - 4	5.8	NA	NA	NA	No
7440-39-3	Barium	53.8	605	UG/L)	DSY-S-MW12-SS12	8/17	70 - 460	605	NA	NA	23,000	No
7439-92-1	Lead	6.1	48.8	UG/L)	DSY-S-MW02-3436	4/17	1 - 3.6	48.8	NA	NA	40	Yes

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background concentration is upper prediction limit. See Appendix G.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, June 2011.
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
7 - Value is for acenaphthene.
8 - Value is for pyrene.
9 - Value is for chlordane.
10 - Value is for hexavalent chromium.
11 - Value is MCL based soil screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

Definitions:

- J = Estimated value
NA = Not Applicable/Not Available

TABLE 5-7
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
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Associated Samples

DSY-S-MW02-1820	DSY-S-TP16-1112
DSY-S-MW02-2426	DSY-S-TP18-0507
DSY-S-MW02-3436	DSY-S-TP18-1011
DSY-S-MW03-0810	DSY-S-TP19-0507
DSY-S-MW03-1618	DSY-S-TP19-1011
DSY-S-MW04-0810	DSY-S-TP20-0507
DSY-S-MW04-1618	DSY-S-TP20-1011
DSY-S-MW11-0103	DSY-S-TP21-0507
DSY-S-MW11-1113	DSY-S-TP21-1011
DSY-S-MW11-1113-D	DSY-S-TP22-0506
DSY-S-MW11-2729	DSY-S-TP22-1112
DSY-S-MW11-2931	DSY-S-TP23-0507
DSY-S-MW11-2931-D	DSY-S-TP23-0910
DSY-S-MW12-SS05	DSY-S-TP24-0102
DSY-S-MW12-SS12	DSY-S-TP24-0102-D
DSY-S-MW12-SS16	DSY-S-TP24-0507
DSY-SB204-SO-0810	DSY-S-TP24-1011
DSY-SB205-SO-088.5	DSY-S-TP27-0507
DSY-SB206-SO-0810	DSY-S-TP27-1011
DSY-SB207-SO-1012	DSY-S-TP28-0507
DSY-S-TP16-0506	DSY-S-TP28-1314

TABLE 5-8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Volatile Organic Compounds														
67-64-1	Acetone	10 J	10 J	ug/L	DSY-A-MW03-01	1/14	5 - 40	10	NA	1,200 N	NA NA	NA NA	No	BSL
156-59-2	cis-1,2-Dichloroethene	0.284 J	4.26	ug/L	DSY-GW-MW220-030111	5/9	0.5 - 0.5	4.26	NA	2.8 N	70 70	EPA-MCL RIDEM	Yes	ASL
127-18-4	Tetrachloroethene	0.696 J	0.696 J	ug/L	DSY-GW-MW03-022411	1/14	0.5 - 10	0.696	NA	3.5 N ⁽⁷⁾	5 5	EPA-MCL RIDEM	No	BSL
156-60-5	trans-1,2-Dichloroethene	0.669 J	4.81	ug/L	DSY-GW-MW12-030311	3/9	0.5 - 0.5	4.81	NA	8.6 N	100 100	EPA-MCL RIDEM	No	BSL
79-01-6	Trichloroethene	3.16	33	ug/L	DSY-A-MW03-01-D	8/14	0.5 - 10	33	NA	0.26 N ⁽⁷⁾	5 5	EPA-MCL RIDEM	Yes	ASL
75-01-4	Vinyl Chloride	1.47	1.47	ug/L	DSY-GW-MW220-030111	1/14	0.5 - 10	1.47	NA	0.015 C	2 2	EPA-MCL RIDEM	Yes	ASL
Metals (Total)														
7429-90-5	Aluminum	337	337	ug/L	DSY-GW-MW204-031711	1/6	43.9 - 227	337	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	Yes	ASL
7440-38-2	Arsenic	4.3 J	13.2	ug/L	DSY-A-MW11-01	3/6	1.5 - 4	13.2	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
7440-39-3	Barium	11.6	44.4	ug/L	DSY-A-MW02-01	3/6	10.4 - 33.5	44.4	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
7440-70-2	Calcium	22,000 J	80,200	ug/L	DSY-A-MW04-01	6/6	-	80,200	NA	NA	NA NA	NA NA	No	NUT
7440-47-3	Chromium	0.508 J	7.3 J	ug/L	DSY-A-MW11-01	2/6	6 - 6	7.3	NA	0.031 C	100 100	EPA-MCL RIDEM	Yes	ASL
7440-50-8	Copper	5.4 J	5.8 J	ug/L	DSY-A-MW03-01-D	1/6	2 - 5	5.8	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
7439-89-6	Iron	78.3 J	605 J	ug/L	DSY-GW-MW204-031711	3/6	134 - 216	605	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
7439-95-4	Magnesium	6,700 J	31,600	ug/L	DSY-A-MW02-01	6/6	-	31,600	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	30	373	ug/L	DSY-A-MW11-01	6/6	19.9 - 19.9	373	NA	32 N	50 NA	EPA-SDWR NA	Yes	ASL
7440-02-0	Nickel	3.38	11.4 J	ug/L	DSY-A-MW03-01-D	2/6	9 - 9	11.4	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	1,660	17,100	ug/L	DSY-A-MW02-01	6/6	-	17,100	NA	NA	NA NA	NA NA	No	NUT
7440-23-5	Sodium	29,700	200,000	ug/L	DSY-A-MW02-01	6/6	-	200,000	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	6.65	68.3	ug/L	DSY-A-MW02-01	4/6	15.2 - 17.3	68.3	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
Metals (Dissolved)														
7429-90-5	Aluminum	72	72	ug/L	DSY-GW-MW204-031711	1/1	-	72	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	Yes	ASL
7440-39-3	Barium	11.5	11.5	ug/L	DSY-GW-MW204-031711	1/1	-	11.5	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL

TABLE 5-8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Dissolved Metals (Continued)														
7440-70-2	Calcium	30,800 J	30,800 J	ug/L	DSY-GW-MW204-031711	1/1	-	30,800	NA	NA	NA NA	NA NA	No	NUT
7440-50-8	Copper	1.19 J	1.19 J	ug/L	DSY-GW-MW204-031711	1/1	-	1.19	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
7439-89-6	Iron	50.5 J	50.5 J	ug/L	DSY-GW-MW204-031711	1/1	-	50.5	NA	1,100 N	300 NA	EPA-SDWR NA	No	BSL
7439-95-4	Magnesium	7,450 J	7,450 J	ug/L	DSY-GW-MW204-031711	1/1	-	7,450	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	53.3	53.3	ug/L	DSY-GW-MW204-031711	1/1	-	53.3	NA	32 N	50	EPA-SDWR	Yes	ASL
											NA	NA		
7440-02-0	Nickel	3.39	3.39	ug/L	DSY-GW-MW204-031711	1/1	-	3.39	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	1,770	1,770	ug/L	DSY-GW-MW204-031711	1/1	-	1,770	NA	NA	NA NA	NA NA	No	NUT
7440-23-5	Sodium	42,300	42,300	ug/L	DSY-GW-MW204-031711	1/1	-	42,300	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	6.48	6.48	ug/L	DSY-GW-MW204-031711	1/1	-	6.48	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available for groundwater.
5 - USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples	
DSY-GW-MW02A-022411	DSY-GW-MW222-030211
DSY-GW-MW03-022411	DSY-GW-MW223-031611
DSY-GW-MW11A-022611	DSY-A-MW02-01
DSY-GW-MW11A-022611-D	DSY-A-MW03-01
DSY-GW-MW12-030311	DSY-A-MW03-01-D
DSY-GW-MW204-031711	DSY-A-MW04-01
DSY-GW-MW220-030111	DSY-A-MW11-01
DSY-GW-MW221-030211	DSY-A-MW12-01

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)
EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
RIDEM = Rhode Island Department of Environmental Management GA Groundwater Objective (November, 2011).

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 5-9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Vapor Intrusion Criteria ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Volatile Organic Compounds														
67-64-1	Acetone	10 J	10 J	ug/L	DSY-A-MW03-01	1/14	5 - 40	10	NA	2,300,000 N	NA	NA	No	BSL
156-59-2	cis-1,2-Dichloroethene	0.284 J	4.26	ug/L	DSY-GW-MW220-030111	5/9	0.5 - 0.5	4.26	NA	NA	NA	NA	No	NTX
127-18-4	Tetrachloroethene	0.696 J	0.696 J	ug/L	DSY-GW-MW03-022411	1/14	0.5 - 10	0.696	NA	5.8 N ⁽⁷⁾	NA	NA	No	BSL
156-60-5	trans-1,2-Dichloroethene	0.669 J	4.81	ug/L	DSY-GW-MW12-030311	3/9	0.5 - 0.5	4.81	NA	38 N	NA	NA	No	BSL
79-01-6	Trichloroethene	3.16	33	ug/L	DSY-A-MW03-01-D	8/14	0.5 - 10	33	NA	0.52 N ⁽⁷⁾ 0.14 C	NA	NA	Yes	ASL
75-01-4	Vinyl Chloride	1.47	1.47	ug/L	DSY-GW-MW220-030111	1/14	0.5 - 10	1.47	NA		NA	NA	Yes	ASL
Metals														
7429-90-5	Aluminum	337	337	ug/L	DSY-GW-MW204-031711	1/6	43.9 - 227	337	NA	NA	NA	NA	No	NTX
7440-38-2	Arsenic	4.3 J	13.2	ug/L	DSY-A-MW11-01	3/6	1.5 - 4	13.2	NA	NA	NA	NA	No	NTX
7440-39-3	Barium	11.6	44.4	ug/L	DSY-A-MW02-01	3/6	10.4 - 33.5	44.4	NA	NA	NA	NA	No	NTX
7440-70-2	Calcium	22,000 J	80,200	ug/L	DSY-A-MW04-01	6/6	-	80,200	NA	NA	NA	NA	No	NUT
7440-47-3	Chromium	0.508 J	7.3 J	ug/L	DSY-A-MW11-01	2/6	6 - 6	7.3	NA	NA	NA	NA	No	NTX
7440-50-8	Copper	5.4 J	5.8 J	ug/L	DSY-A-MW03-01-D	1/6	2 - 5	5.8	NA	NA	NA	NA	No	NTX
7439-89-6	Iron	78.3 J	605 J	ug/L	DSY-GW-MW204-031711	3/6	134 - 216	605	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	6,700 J	31,600	ug/L	DSY-A-MW02-01	6/6	-	31,600	NA	NA	NA	NA	No	NUT
7439-96-5	Manganese	30	373	ug/L	DSY-A-MW11-01	6/6	19.9 - 19.9	373	NA	NA	NA	NA	No	NTX
7440-02-0	Nickel	3.38	11.4 J	ug/L	DSY-A-MW03-01-D	2/6	9 - 9	11.4	NA	NA	NA	NA	No	NTX
7440-09-7	Potassium	1,660	17,100	ug/L	DSY-A-MW02-01	6/6	-	17,100	NA	NA	NA	NA	No	NUT
7440-23-5	Sodium	29,700	200,000	ug/L	DSY-A-MW02-01	6/6	-	200,000	NA	NA	NA	NA	No	NUT
7440-66-6	Zinc	6.65	68.3	ug/L	DSY-A-MW02-01	4/6	15.2 - 17.3	68.3	NA	NA	NA	NA	No	NTX
Dissolved Metals														
7429-90-5	Aluminum	72	72	ug/L	DSY-GW-MW204-031711	1/1	-	72	NA	NA	NA	NA	No	NTX
7440-39-3	Barium	11.5	11.5	ug/L	DSY-GW-MW204-031711	1/1	-	11.5	NA	NA	NA	NA	No	NTX
7440-70-2	Calcium	30,800 J	30,800 J	ug/L	DSY-GW-MW204-031711	1/1	-	30,800	NA	NA	NA	NA	No	NUT
7440-50-8	Copper	1.19 J	1.19 J	ug/L	DSY-GW-MW204-031711	1/1	-	1.19	NA	NA	NA	NA	No	NTX
7439-89-6	Iron	50.5 J	50.5 J	ug/L	DSY-GW-MW204-031711	1/1	-	50.5	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	7,450 J	7,450 J	ug/L	DSY-GW-MW204-031711	1/1	-	7,450	NA	NA	NA	NA	No	NUT
7439-96-5	Manganese	53.3	53.3	ug/L	DSY-GW-MW204-031711	1/1	-	53.3	NA	NA	NA	NA	No	NTX
7440-02-0	Nickel	3.39	3.39	ug/L	DSY-GW-MW204-031711	1/1	-	3.39	NA	NA	NA	NA	No	NTX
7440-09-7	Potassium	1,770	1,770	ug/L	DSY-GW-MW204-031711	1/1	-	1,770	NA	NA	NA	NA	No	NUT
7440-23-5	Sodium	42,300	42,300	ug/L	DSY-GW-MW204-031711	1/1	-	42,300	NA	NA	NA	NA	No	NUT
7440-66-6	Zinc	6.48	6.48	ug/L	DSY-GW-MW204-031711	1/1	-	6.48	NA	NA	NA	NA	No	NTX

TABLE 5-9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - No background data is available for groundwater.
- 5 - USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-GW-MW02A-022411	DSY-GW-MW12-030311	DSY-GW-MW220-030111	DSY-A-MW03-01-D
DSY-GW-MW03-022411	DSY-GW-MW204-031711	DSY-GW-MW221-030211	DSY-A-MW04-01
DSY-GW-MW11A-022611	DSY-A-MW02-01	DSY-GW-MW222-030211	DSY-A-MW11-01
DSY-GW-MW11A-022611-D	DSY-A-MW03-01	DSY-GW-MW223-031611	DSY-A-MW12-01

Definitions:

- ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
- C = Carcinogen
- CAS = Chemical Abstracts Service
- COPC = Chemical Of Potential Concern
- J = Estimated value
- NA = Not Applicable/Not Available

Rationale Codes:

- For selection as a COPC:
ASL = Above Screening Level.

- For elimination as a COPC:
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient
NVT = Not sufficiently volatile and/or toxic to pose inhalation risk.

TABLE 5-10
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL GAS - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Range of Background Concentrations ⁽⁴⁾	Screening Toxicity Value ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Volatile Organic Compounds														
71-55-6	1,1,1-Trichloroethane	0.055 J	0.26	ug/m ³	DSY-SG-MW03-0608, DSY-SG-MW03-0608-D	4/4	-	0.26	NA	5,200 N	NA	NA	No	BSL
76-13-1	1,1,2-Trichlorotrifluoroethane	0.5 J	0.79 J	ug/m ³	DSY-SG-MW02A-0708	4/4	-	0.79	NA	31,000 N	NA	NA	No	BSL
75-34-3	1,1-Dichloroethane	0.076 J	0.25	ug/m ³	DSY-SG-MW02A-0708	4/4	-	0.25	NA	15 C	NA	NA	No	BSL
95-63-6	1,2,4-Trimethylbenzene	0.38 J	2.4 J	ug/m ³	DSY-SG-MW03-0608	4/4	0.35 - 0.35	2.4	NA	7.3 N	NA	NA	No	BSL
108-67-8	1,3,5-Trimethylbenzene	0.3 J	1.1	ug/m ³	DSY-SG-MW03-0608	2/4	0.34 - 0.39	1.1	NA	7.3 N ⁽⁶⁾	NA	NA	No	BSL
106-99-0	1,3-Butadiene	2.3	13	ug/m ³	DSY-SG-MW11A-0203	4/4	-	13	NA	0.81 C	NA	NA	Yes	ASL
622-96-8	1-Ethyl-4-Methyl Benzene	0.36 J	1.5 J	ug/m ³	DSY-SG-MW03-0608	4/4	0.35 - 0.35	1.5	NA	NA	NA	NA	No	NTX
78-93-3	2-Butanone	3.3	17	ug/m ³	DSY-SG-MW11A-0203	4/4	-	17	NA	5,200 N	NA	NA	No	BSL
591-78-6	2-Hexanone	0.28 J	1 J	ug/m ³	DSY-SG-MW12-0506	3/4	1.1 - 1.1	1	NA	31 N	NA	NA	No	BSL
108-10-1	4-Methyl-2-Pentanone	0.21 J	0.97	ug/m ³	DSY-SG-MW12-0506	4/4	-	0.97	NA	3,100 N	NA	NA	No	BSL
107-13-1	Acrylonitrile	2.8	2.8	ug/m ³	DSY-SG-MW11A-0203	1/4	1.4 - 1.8	2.8	NA	0.36 C	NA	NA	Yes	ASL
71-43-2	Benzene	0.67	6.8	ug/m ³	DSY-SG-MW11A-0203	4/4	-	6.8	NA	3.1 C	NA	NA	Yes	ASL
108-90-7	Chlorobenzene	0.17 J	0.3 J	ug/m ³	DSY-SG-MW11A-0203	2/4	0.31 - 0.32	0.3	NA	52 N	NA	NA	No	BSL
75-00-3	Chloroethane	0.6 J	1.3 J	ug/m ³	DSY-SG-MW11A-0203	2/4	0.17 - 0.18	1.3	NA	10,000 N	NA	NA	No	BSL
67-66-3	Chloroform	0.14 J	0.7 J	ug/m ³	DSY-SG-MW11A-0203	4/4	-	0.7	NA	1.1 C	NA	NA	No	BSL
74-87-3	Chloromethane	1.3	4.9	ug/m ³	DSY-SG-MW11A-0203	2/4	0.13 - 0.14	4.9	NA	94 N	NA	NA	No	BSL
156-59-2	cis-1,2-Dichloroethene	0.062 J	27	ug/m ³	DSY-SG-MW11A-0203	3/4	0.014 - 0.017	27	NA	63 N ⁽⁷⁾	NA	NA	No	BSL
110-82-7	Cyclohexane	0.3 J	1.8	ug/m ³	DSY-SG-MW02A-0708	3/4	0.24 - 0.24	1.8	NA	6,300 N	NA	NA	No	BSL
75-71-8	Dichlorodifluoromethane	2	3	ug/m ³	DSY-SG-MW03-0608, DSY-SG-MW03-0608-D	4/4	-	3	NA	100 N	NA	NA	No	BSL
100-41-4	Ethylbenzene	0.13 J	1.1	ug/m ³	DSY-SG-MW02A-0708	4/4	-	1.1	NA	9.7 C	NA	NA	No	BSL
110-54-3	Hexane	1.7	4.8	ug/m ³	DSY-SG-MW02A-0708	4/4	-	4.8	NA	730 N	NA	NA	No	BSL
- -	m+p-Xylenes	0.15 J	1.7	ug/m ³	DSY-SG-MW12-0506	4/4	-	1.7	NA	100 N ⁽⁸⁾	NA	NA	No	BSL
1634-04-4	Methyl Tert-Butyl Ether	0.0085 J	0.015 J	ug/m ³	DSY-SG-MW12-0506	2/4	0.014 - 0.016	0.015	NA	94 C	NA	NA	No	BSL
75-09-2	Methylene Chloride	0.65 J	1.5	ug/m ³	DSY-SG-MW03-0608	3/4	0.23 - 0.23	1.5	NA	630 N ⁽⁹⁾	NA	NA	No	BSL
142-82-5	n-Heptane	0.47 J	2.7	ug/m ³	DSY-SG-MW12-0506	4/4	-	2.7	NA	NA	NA	NA	No	NTX
95-47-6	o-Xylene	0.064 J	0.8	ug/m ³	DSY-SG-MW12-0506	4/4	-	0.8	NA	100 N	NA	NA	No	BSL
100-42-5	Styrene	0.43 J	0.69	ug/m ³	DSY-SG-MW11A-0203	2/4	0.28 - 0.29	0.69	NA	1,000 N	NA	NA	No	BSL
127-18-4	Tetrachloroethene	1	12	ug/m ³	DSY-SG-MW11A-0203	4/4	-	12	NA	42 N ⁽⁹⁾	NA	NA	No	BSL
108-88-3	Toluene	0.67	7.2	ug/m ³	DSY-SG-MW02A-0708	4/4	-	7.2	NA	5,200 N	NA	NA	No	BSL
540-59-0	Total 1,2-Dichloroethene	0.062 J	31.1	ug/m ³	DSY-SG-MW11A-0203	3/4	0.014 - 0.017	31.1	NA	63 N ⁽⁹⁾	NA	NA	No	BSL
1330-20-7	Total Xylenes	0.214 J	2.5	ug/m ³	DSY-SG-MW12-0506	4/4	-	2.5	NA	100 N	NA	NA	No	BSL
156-60-5	trans-1,2-Dichloroethene	4.1	4.1	ug/m ³	DSY-SG-MW11A-0203	1/4	0.013 - 0.017	4.1	NA	63 N	NA	NA	No	BSL
79-01-6	Trichloroethene	0.088 J	120	ug/m ³	DSY-SG-MW11A-0203	4/4	-	120	NA	2.1 N ⁽⁹⁾	NA	NA	Yes	ASL
75-69-4	Trichlorofluoromethane	1.8	7.4	ug/m ³	DSY-SG-MW12-0506	4/4	-	7.4	NA	730 N	NA	NA	No	BSL
75-01-4	Vinyl Chloride	0.15 J	0.76	ug/m ³	DSY-SG-MW02A-0708	4/4	-	0.76	NA	1.6 C	NA	NA	No	BSL

TABLE 5-10
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL GAS - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - No background data is available.
- 5 - USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
- 6 - Value is for 1,2,4-trimethylbenzene.
- 7 - Value is for trans-1,2-dichloroethene.
- 8 - Value is for m-xylene.
- 9 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-SG-MW02A-0708	DSY-SG-MW03-0608-D	DSY-SG-MW12-0506
DSY-SG-MW03-0608	DSY-SG-MW11A-0203	

Definitions:

- ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
- C = Carcinogen
- COPC = Chemical Of Potential Concern
- J = Estimated value
- N = Noncarcinogen
- NA = Not Applicable/Not Available

Rationale Codes:

- For selection as a COPC:
 - ASL = Above Screening Level.

- For elimination as a COPC:
 - BSL = Below COPC Screening Level
 - NUT = Essential nutrient
 - NTX = No toxicity criteria

TABLE 5-11
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Semivolatile Organic Compounds													
108-60-1	2,2'-Oxybis(1-Chloropropane)	180 J	180 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	180	NA	4,600 C	NA	No	BSL
95-48-7	2-Methylphenol	83 J	83 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	83	NA	310,000 N	NA	No	BSL
106-44-5	4-Methylphenol	500 J	500 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	500	NA	610,000 N	NA	No	BSL
83-32-9	Acenaphthene	92 J	92 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	92	NA	340,000 N	43,000	No	BSL
120-12-7	Anthracene	130 J	130 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	130	NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	140 J	410 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	410	NA	150 C	900	Yes	ASL
50-32-8	Benzo(a)pyrene	86 J	140 J	ug/kg	DSY-S-TP17-0001	2/6	330 - 400	140	NA	15 C	400	Yes	ASL
205-99-2	Benzo(b)fluoranthene	230 J	410 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	410	NA	150 C	900	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	110 J	130 J	ug/kg	DSY-S-TP17-0001	2/6	330 - 400	130	NA	170,000 N ⁽⁸⁾	800	No	BSL
207-08-9	Benzo(k)fluoranthene	360 J	360 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	360	NA	1,500 C	900	No	BSL
86-74-8	Carbazole	97 J	97 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	97	NA	NA	NA	No	NTX
218-01-9	Chrysene	120 J	420 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	420	NA	15,000 C	400	Yes	ASL
206-44-0	Fluoranthene	330 J	870 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	870	NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	65 J	65 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	65	NA	230,000 N	28,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	140 J	150 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	150	NA	150 C	900	No	BSL
85-01-8	Phenanthrene	130 J	580 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	580	NA	170,000 N ⁽⁸⁾	40,000	No	BSL
108-95-2	Phenol	1,200 J	1,200 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	1,200	NA	1,800,000 N	6,000,000	No	BSL
129-00-0	Pyrene	300 J	740 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	740	NA	170,000 N	13,000	No	BSL
Pesticides/PCBs													
72-54-8	4,4'-DDD	4.3	4.3	ug/kg	DSY-S-TP15-0001	1/6	3.3 - 4	4.3	NA	2,000 C	NA	No	BSL
50-29-3	4,4'-DDT	6.2	6.2	ug/kg	DSY-S-TP15-0001	1/6	3.3 - 4	6.2	NA	1,700 C	NA	No	BSL
11096-82-5	Aroclor-1260	32 J	32 J	ug/kg	DSY-S-TP15-0001	1/6	33 - 40	32	NA	220 C	NA	No	BSL
Metals													
7429-90-5	Aluminum	5,820	13,200	mg/kg	DSY-S-TP12-0001	6/6	-	13,200	16,020	7,700 N	NA	No	BKG
7440-38-2	Arsenic	3.9	24.4	mg/kg	DSY-S-TP11-0001	6/6	-	24.4	13	0.39 C	7	Yes	ASL
7440-39-3	Barium	12.1	24	mg/kg	DSY-S-TP15-0001	6/6	-	24	51	1,500 N	5,500	No	BSL, BKG
7440-41-7	Beryllium	0.23 J	0.47	mg/kg	DSY-S-TP15-0001	6/6	-	0.47	0.58	16 N	1.5	No	BSL, BKG
7440-43-9	Cadmium	0.75 J	1 J	mg/kg	DSY-S-TP15-0001	4/6	0.48 - 0.61	1	0.17	7 N	39	No	BSL
7440-70-2	Calcium	426 J	1,130 J	mg/kg	DSY-S-MW07-0001	6/6	-	1,130	1,600	NA	NA	No	NUT, BKG
7440-47-3	Chromium	9.6	18.2	mg/kg	DSY-S-TP12-0001	6/6	-	18.2	16	0.29 C ⁽⁹⁾	390 ⁽⁹⁾	Yes	ASL
7440-48-4	Cobalt	7.6 J	14.7	mg/kg	DSY-S-MW07-0001	6/6	-	14.7	9	2.3 N	NA	Yes	ASL
7440-50-8	Copper	15.1	31.8	mg/kg	DSY-S-TP12-0001	6/6	-	31.8	12	310 N	3,100	No	BSL
7439-89-6	Iron	18,000	32,500	mg/kg	DSY-S-TP12-0001	6/6	-	32,500	24,200	5,500 N	NA	Yes	ASL
7439-92-1	Lead	5.8 J	27.4	mg/kg	DSY-S-TP15-0001	6/6	-	27.4	40	400	150	No	BSL, BKG
7439-95-4	Magnesium	2,310	3,970	mg/kg	DSY-S-TP12-0001	6/6	-	3,970	2,571	NA	NA	No	NUT
7439-96-5	Manganese	272	448	mg/kg	DSY-S-MW07-0001	6/6	-	448	349	180 N	390	Yes	ASL
7439-97-6	Mercury	0.12	0.12	mg/kg	DSY-S-MW07-0001	1/6	0.05 - 0.13	0.12	0.18	2.3 N ⁽¹⁰⁾	23	No	BSL, BKG
7440-02-0	Nickel	14.5	27.1	mg/kg	DSY-S-TP12-0001	6/6	-	27.1	15	150 N	1,000	No	BSL
7440-09-7	Potassium	241	606	mg/kg	DSY-S-TP17-0001	6/6	-	606	651	NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.74 J	1.2	mg/kg	DSY-S-TP15-0001	3/6	0.62 - 0.82	1.2	0.57	39 N	390	No	BSL
7440-23-5	Sodium	87.9	87.9	mg/kg	DSY-S-TP17-0001	1/6	22.6 - 69.7	87.9	231	NA	NA	No	NUT, BKG
7440-62-2	Vanadium	8.6	21.8 J	mg/kg	DSY-S-TP15-0001	6/6	-	21.8	34	39 N	550	No	BSL, BKG
7440-66-6	Zinc	32.7 J	71	mg/kg	DSY-S-TP15-0001	6/6	-	71	62	2,300 N	6,000	No	BSL

TABLE 5-11
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Miscellaneous Parameters													
1461-25-2	Tetrabutyltin	8.8 J	8.8 J	ug/kg	DSY-S-TP15-0001	1/6	49 - 50	8.8	NA	1,800 N ⁽¹¹⁾	NA	No	BSL
56573-85-4	Tributyltin	4.8 J	4.8 J	ug/kg	DSY-S-TP15-0001	1/6	49 - 50	4.8	NA	1,800 N	NA	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Value is for pyrene.
- 9 - Value is for hexavalent chromium.
- 10 - Value is for mercuric chloride (and other mercury salts).
- 11 - Value is for dibutyltin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-S-MW05-SS01
DSY-S-MW05-SS01-D
DSY-S-MW07-0001
DSY-S-TP11-0001
DSY-S-TP12-0001
DSY-S-TP15-0001
DSY-S-TP17-0001

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 5-12
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Semivolatile Organic Compounds												
108-60-1	2,2'-Oxybis(1-Chloropropane)	180 J	180 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	180	NA	0.11	NA	Yes
95-48-7	2-Methylphenol	83 J	83 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	83	NA	580	NA	No
106-44-5	4-Methylphenol	500 J	500 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	500	NA	1,100	NA	No
83-32-9	Acenaphthene	92 J	92 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	92	NA	4,100	NA	No
120-12-7	Anthracene	130 J	130 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	130	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	140 J	410 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	410	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	86 J	140 J	ug/kg	DSY-S-TP17-0001	2/6	330 - 400	140	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	230 J	410 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	410	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	110 J	130 J	ug/kg	DSY-S-TP17-0001	2/6	330 - 400	130	NA	9,500 ⁽⁷⁾	NA	No
207-08-9	Benzo(k)fluoranthene	360 J	360 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	360	NA	350	NA	Yes
86-74-8	Carbazole	97 J	97 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	97	NA	NA	NA	No
218-01-9	Chrysene	120 J	420 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	420	NA	1,100	NA	No
206-44-0	Fluoranthene	330 J	870 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	870	NA	70,000	NA	No
86-73-7	Fluorene	65 J	65 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	65	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	140 J	150 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	150	NA	120	NA	Yes
85-01-8	Phenanthrene	130 J	580 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	580	NA	9,500 ⁽⁷⁾	NA	No
108-95-2	Phenol	1,200 J	1,200 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	1,200	NA	2,600	NA	No
129-00-0	Pyrene	300 J	740 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	740	NA	9,500	NA	No
Pesticides/PCBs												
72-54-8	4,4'-DDD	4.3	4.3	ug/kg	DSY-S-TP15-0001	1/6	3.3 - 4	4.3	NA	66	NA	No
50-29-3	4,4'-DDT	6.2	6.2	ug/kg	DSY-S-TP15-0001	1/6	3.3 - 4	6.2	NA	67	NA	No
11096-82-5	Aroclor-1260	32 J	32 J	ug/kg	DSY-S-TP15-0001	1/6	33 - 40	32	NA	24	NA	Yes
Metals												
7429-90-5	Aluminum	5,820	13,200	mg/kg	DSY-S-TP12-0001	6/6	-	13,200	16,020	23,000	NA	No
7440-38-2	Arsenic	3.9	24.4	mg/kg	DSY-S-TP11-0001	6/6	-	24.4	13	0.0013	NA	Yes
7440-39-3	Barium	12.1	24	mg/kg	DSY-S-TP15-0001	6/6	-	24	51	120	NA	No
7440-41-7	Beryllium	0.23 J	0.47	mg/kg	DSY-S-TP15-0001	6/6	-	0.47	0.58	13	NA	No
7440-43-9	Cadmium	0.75 J	1 J	mg/kg	DSY-S-TP15-0001	4/6	0.48 - 0.61	1	0.17	0.52	NA	Yes
7440-70-2	Calcium	426 J	1,130 J	mg/kg	DSY-S-MW07-0001	6/6	-	1,130	1,600	NA	NA	No
7440-47-3	Chromium	9.6	18.2	mg/kg	DSY-S-TP12-0001	6/6	-	18.2	16	0.00059 ⁽⁸⁾	NA	Yes
7440-48-4	Cobalt	7.6 J	14.7	mg/kg	DSY-S-MW07-0001	6/6	-	14.7	9	0.21	NA	Yes
7440-50-8	Copper	15.1	31.8	mg/kg	DSY-S-TP12-0001	6/6	-	31.8	12	22	NA	Yes
7439-89-6	Iron	18,000	32,500	mg/kg	DSY-S-TP12-0001	6/6	-	32,500	24,200	270	NA	Yes
7439-92-1	Lead	5.8 J	27.4	mg/kg	DSY-S-TP15-0001	6/6	-	27.4	40	14 ⁽⁹⁾	NA	No
7439-95-4	Magnesium	2,310	3,970	mg/kg	DSY-S-TP12-0001	6/6	-	3,970	2,571	NA	NA	No
7439-96-5	Manganese	272	448	mg/kg	DSY-S-MW07-0001	6/6	-	448	349	21	NA	Yes
7439-97-6	Mercury	0.12	0.12	mg/kg	DSY-S-MW07-0001	1/6	0.05 - 0.13	0.12	0.18	0.033	NA	No
7440-02-0	Nickel	14.5	27.1	mg/kg	DSY-S-TP12-0001	6/6	-	27.1	15	20	NA	Yes
7440-09-7	Potassium	241	606	mg/kg	DSY-S-TP17-0001	6/6	-	606	651	NA	NA	No
7782-49-2	Selenium	0.74 J	1.2	mg/kg	DSY-S-TP15-0001	3/6	0.62 - 0.82	1.2	0.57	0.4	NA	Yes
7440-23-5	Sodium	87.9	87.9	mg/kg	DSY-S-TP17-0001	1/6	22.6 - 69.7	87.9	231	NA	NA	No
7440-62-2	Vanadium	8.6	21.8 J	mg/kg	DSY-S-TP15-0001	6/6	-	21.8	34	78	NA	No
7440-66-6	Zinc	32.7 J	71	mg/kg	DSY-S-TP15-0001	6/6	-	71	62	290	NA	No

TABLE 5-12
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Miscellaneous Parameters												
1461-25-2	Tetrabutyltin	8.8 J	8.8 J	ug/kg	DSY-S-TP15-0001	1/6	49 - 50	8.8	NA	NA	NA	No
56573-85-4	Tributyltin	4.8 J	4.8 J	ug/kg	DSY-S-TP15-0001	1/6	49 - 50	4.8	NA	NA	NA	No
TCLP Metals												
7440-38-2	Arsenic	4.6 J	5.7 J	ug/L	DSY-S-MW07-0001	1/6	4 - 5.3	5.7	NA	NA	NA	No
7440-39-3	Barium	186	306	ug/L	DSY-S-TP12-0001	2/6	87.1 - 724	306	NA	NA	23,000	No
7439-92-1	Lead	12.8	21.1	ug/L	DSY-S-TP15-0001	3/6	1 - 1.8	21.1	NA	NA	40	No
7782-49-2	Selenium	4	7.7	ug/L	DSY-S-TP12-0001	2/6	4 - 4	7.7	NA	NA	600	No

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
- 6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 7 - Value is for pyrene.
- 8 - Value is for hexavalent chromium.
- 9 - Value is MCL based soil screening level.

Definitions:

- C = Carcinogen
- J = Estimated value
- N = Noncarcinogen
- NA = Not Applicable/Not Available

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

Associated Samples

- DSY-S-MW05-SS01
- DSY-S-MW05-SS01-D
- DSY-S-MW07-0001
- DSY-S-TP11-0001
- DSY-S-TP12-0001
- DSY-S-TP15-0001
- DSY-S-TP17-0001

TABLE 5-13
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Volatile Organic Compounds													
67-64-1	Acetone	7 B	110 B	ug/kg	N1-250	17/35	11 - 110	110	NA	6,100,000 N	7,800,000	No	BSL
75-15-0	Carbon Disulfide	4 J	4 J	ug/kg	DSY-S-MW07-2224	1/18	11 - 13	4	NA	82,000 N	NA	No	BSL
75-09-2	Methylene Chloride	1 JB	1 JB	ug/kg	N1-A, N1-E, S42 SWN	3/21	11 - 34	1	NA	11,000 C	45,000	No	BSL
108-88-3	Toluene	0.9 J	10 J	ug/kg	S42 SWW	3/20	11 - 13	10	NA	500,000 N	190,000	No	BSL
1330-20-7	Total Xylenes	1 J	1 J	ug/kg	S42 SWN	1/19	11 - 13	1	NA	63,000 N	110,000	No	BSL
Semivolatile Organic Compounds													
91-57-6	2-Methylnaphthalene	50 J	280 J	ug/kg	DSY-S-MW07-0810	3/18	340 - 4000	280	NA	23,000 N	123,000	No	BSL
83-32-9	Acenaphthene	41 J	270 J	ug/kg	N1-B	3/21	340 - 4000	270	NA	340,000 N	43,000	No	BSL
208-96-8	Acenaphthylene	43 J	43 J	ug/kg	S42 SWN	1/19	340 - 4000	43	NA	340,000 N ⁽⁸⁾	23,000	No	BSL
120-12-7	Anthracene	48 J	490	ug/kg	N1-B	5/23	340 - 4000	490	NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	47 J	1,300	ug/kg	N1-B	10/25	340 - 4000	1,300	NA	150 C	900	Yes	ASL
50-32-8	Benzo(a)pyrene	42 J	690	ug/kg	N1-B	11/25	340 - 4000	690	NA	15 C	400	Yes	ASL
205-99-2	Benzo(b)fluoranthene	63 J	910	ug/kg	N1-B	11/25	340 - 4000	910	NA	150 C	900	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	56 J	250 J	ug/kg	S42 SWN	4/21	340 - 4000	250	NA	170,000 N ⁽⁹⁾	800	No	BSL
207-08-9	Benzo(k)fluoranthene	42 J	350	ug/kg	N1-B	7/24	340 - 4000	350	NA	1,500 C	900	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	39 J	160 J	ug/kg	DPSOIL02	5/23	340 - 4000	160	NA	35,000 C	46,000	No	BSL
85-68-7	Butyl Benzyl Phthalate	48 J	48 J	ug/kg	DSY-SB-09-1416	1/18	340 - 4000	48	NA	260,000 C	NA	No	BSL
218-01-9	Chrysene	51 J	1,300	ug/kg	N1-B	12/25	340 - 4000	1,300	NA	15,000 C	400	Yes	ASL
53-70-3	Dibenzo(a,h)anthracene	46 J	46 J	ug/kg	N1-250	1/19	340 - 4000	46	NA	15 C	400	Yes	ASL
206-44-0	Fluoranthene	41 J	4,400	ug/kg	N1-B	17/30	340 - 4000	4,400	NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	44 J	730	ug/kg	N1-B	3/21	340 - 4000	730	NA	230,000 N	28,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	62 J	240 J	ug/kg	S42 SWN	4/22	340 - 4000	240	NA	150 C	900	Yes	ASL
91-20-3	Naphthalene	1 J	77 J	ug/kg	DPSOIL02	3/20	340 - 4000	77	NA	3,600 C	54,000	No	BSL
85-01-8	Phenanthrene	37 J	5,200	ug/kg	N1-B	14/26	340 - 4000	5,200	NA	170,000 N ⁽⁹⁾	40,000	No	BSL
129-00-0	Pyrene	34 J	3,000	ug/kg	N1-B	17/30	340 - 4000	3,000	NA	170,000 N	13,000	No	BSL
Pesticides/PCBs													
72-54-8	4,4'-DDD	7.4 J	220 J	ug/kg	DSY-S-MW07-1618-D	3/18	3.4 - 5.3	220	NA	2,000 C	NA	No	BSL
72-55-9	4,4'-DDE	11 J	11 J	ug/kg	DSY-S-MW07-1618-D	1/18	3.4 - 5.3	11	NA	1,400 C	NA	No	BSL
50-29-3	4,4'-DDT	100 J	100 J	ug/kg	DSY-S-MW07-1618-D	1/18	3.4 - 5.3	100	NA	1,700 C	NA	No	BSL
11096-82-5	Aroclor-1260	13 J	13 J	ug/kg	DSY-S-TP25-1011	1/18	34 - 53	13	NA	220 C	NA	No	BSL
1336-36-3	Total Aroclors	58 P	100	ug/kg	S42 SWN	2/2	-	100	NA	220 C	10,000	No	BSL
72-20-8	Endrin	5.5	5.5	ug/kg	DSY-S-TP11-1213	1/18	3.4 - 5.3	5.5	NA	1,800 N	NA	No	BSL
Metals													
7429-90-5	Aluminum	4,820	14,300	mg/kg	DSY-S-TP12-1213	27/27	-	14,300	13,075	7,700 N	NA	Yes	ASL
7440-38-2	Arsenic	3.9	37.3	mg/kg	DSY-S-TP12-1213	43/44	4.1 - 4.1	37.3	20	0.39 C	7	Yes	ASL
7440-39-3	Barium	6.3	37	mg/kg	S42 SWN	42/44	2.6 - 4.1	37	36	1,500 N	5,500	No	BSL
7440-41-7	Beryllium	0.22 J	0.54	mg/kg	DSY-S-TP13-1011	23/27	0.18 - 0.23	0.54	0.64	16 N	1.5	No	BSL, BKG
7440-43-9	Cadmium	0.7 J	2.8	mg/kg	N1-0	24/44	0.51 - 1.3	2.8	0.23	7 N	39	No	BSL
7440-70-2	Calcium	363 J	3,630 J	mg/kg	DSY-SB-09-1416	27/27	-	3,630	1,689	NA	NA	No	NUT
7440-47-3	Chromium	6.3 J	22	mg/kg	N1-0	44/44	-	22	18	0.29 C ⁽¹⁰⁾	390 ⁽¹⁰⁾	Yes	ASL
7440-48-4	Cobalt	3.9 J	20.2 J	mg/kg	DSY-S-TP11-1213	27/27	-	20.2	17	2.3 N	NA	Yes	ASL
7440-50-8	Copper	5.1 J	27.9	mg/kg	DSY-S-TP25-0507	27/27	-	27.9	24	310 N	3,100	No	BSL
7439-89-6	Iron	14,300	40,100	mg/kg	DSY-S-TP11-1213	27/27	-	40,100	39,173	5,500 N	NA	Yes	ASL

TABLE 5-13
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - CENTRAL SHIPYARD
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
7439-92-1	Lead	2.1 J	45	mg/kg	N1-E	44/44	-	45	12	400	150	No	BSL
7439-95-4	Magnesium	1,900	4,530	mg/kg	DSY-S-TP12-1213	27/27	-	4,530	3,811	NA	NA	No	NUT
Metals (continued)													
7439-96-5	Manganese	86.2 J	612 J	mg/kg	DSY-S-TP11-1213	27/27	-	612	1,037	180 N	390	No	BKG
7439-97-6	Mercury	0.07	0.15	mg/kg	DSY-S-MW07-1618-D	2/27	0.04 - 0.13	0.15	0.012	2.3 N ⁽¹¹⁾	23	No	BSL
7440-02-0	Nickel	10.4 J	33.1	mg/kg	DSY-S-TP11-1213	27/27	-	33.1	28	150 N	1,000	No	BSL
7440-09-7	Potassium	190	658	mg/kg	DSY-SB-14-0103-D	27/27	179 - 179	658	1,699	NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.83 J	1.4	mg/kg	DSY-S-TP13-0506	4/25	0.68 - 1.1	1.4	0.286	39 N	390	No	BSL
7440-22-4	Silver	1.6 J	5	mg/kg	N1-0	10/36	1 - 1.6	5	0.12	39 N	200	No	BSL
7440-23-5	Sodium	82.8	228	mg/kg	DSY-S-MW07-3436	3/27	21.4 - 143	228	83	NA	NA	No	NUT
7440-62-2	Vanadium	8.9 J	22.8 J	mg/kg	DSY-SB-10-1416	27/27	-	22.8	23	39 N	550	No	BSL, BKG
7440-66-6	Zinc	28 J	82.5	mg/kg	DSY-SB-03-0911	27/27	-	82.5	66	2,300 N	6,000	No	BSL
Miscellaneous Parameters													
1461-25-2	Tetrabutyltin	4.6 J	27 J	ug/kg	DSY-S-TP13-0506	1/18	49 - 50	27	NA	1,800 N ⁽¹²⁾	NA	No	BSL
56573-85-4	Tributyltin	4.9 J	4.9 J	ug/kg	DSY-S-MW05-1012	1/18	49 - 50	4.9	NA	1,800 N	NA	No	BSL

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.

2 - Values presented are sample-specific quantitation limits.

3 - The maximum detected concentration is used for screening purposes.

4 - Background concentration is upper prediction limit. See Appendix G.

5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).

6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.

7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

8 - Value is for acenaphthene.

9 - Value is for pyrene.

10 - Value is for hexavalent chromium.

11 - Value is for mercuric chloride (and other mercury salts).

12 - Value is for dibutyltin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples					
DSY-S-MW04-3234	DSY-S-MW07-3436	N1-C	DSY-SB-01-0911	DSY-S-TP12-0507	DSY-S-TP25-0507
DSY-S-MW05-1012	N1-0	N1-D	DSY-SB-03-0911	DSY-S-TP12-1213	DSY-S-TP25-1011
DSY-S-MW05-2224	N1-100	N1-E	DSY-SB-09-1416	DSY-S-TP13-0506	DPSOIL02
DSY-S-MW05-3234	N1-150	S1	DSY-SB-10-1416	DSY-S-TP13-0506-D	
DSY-S-MW05-4446	N1-200	S42 BOT	DSY-SB-14-0103	DSY-S-TP13-1011	
DSY-S-MW07-0810	N1-250	S42 SWE	DSY-SB-14-0103-D	DSY-S-TP15-0506	
DSY-S-MW07-1618	N1-50	S42 SWN	DSY-SB-15-0103	DSY-S-TP15-1112	
DSY-S-MW07-1618-D	N1-A	S42 SWS	DSY-S-TP11-0507	DSY-S-TP17-0507	
DSY-S-MW07-2224	N1-B	S42 SWW	DSY-S-TP11-1213	DSY-S-TP17-1112	

Definitions:

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

TABLE 5-14
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Volatile Organic Compounds												
67-64-1	Acetone	7 B	110 B	ug/kg	N1-250	17/35	11 - 110	110	NA	2,400	NA	No
75-15-0	Carbon Disulfide	4 J	4 J	ug/kg	DSY-S-MW07-2224	1/18	11 - 13	4	NA	210	NA	No
75-09-2	Methylene Chloride	1 JB	1 JB	ug/kg	N1-A, N1-E, S42 SWN	3/21	11 - 34	1	NA	2.5	NA	No
108-88-3	Toluene	0.9 J	10 J	ug/kg	S42 SWW	3/20	11 - 13	10	NA	590	32,000	No
1330-20-7	Total Xylenes	1 J	1 J	ug/kg	S42 SWN	1/19	11 - 13	1	NA	190	540,000	No
Semivolatile Organic Compounds												
91-57-6	2-Methylnaphthalene	50 J	280 J	ug/kg	DSY-S-MW07-0810	3/18	340 - 4000	280	NA	140	NA	Yes
83-32-9	Acenaphthene	41 J	270 J	ug/kg	N1-B	3/21	340 - 4000	270	NA	4,100	NA	No
208-96-8	Acenaphthylene	43 J	43 J	ug/kg	S42 SWN	1/19	340 - 4000	43	NA	4,100 ⁽⁸⁾	NA	No
120-12-7	Anthracene	48 J	490	ug/kg	N1-B	5/23	340 - 4000	490	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	47 J	1,300	ug/kg	N1-B	10/25	340 - 4000	1,300	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	42 J	690	ug/kg	N1-B	11/25	340 - 4000	690	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	63 J	910	ug/kg	N1-B	11/25	340 - 4000	910	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	56 J	250 J	ug/kg	S42 SWN	4/21	340 - 4000	250	NA	9,500 ⁽⁹⁾	NA	No
207-08-9	Benzo(k)fluoranthene	42 J	350	ug/kg	N1-B	7/24	340 - 4000	350	NA	350	NA	No
117-81-7	Bis(2-ethylhexyl)phthalate	39 J	160 J	ug/kg	DPSOIL02	5/23	340 - 4000	160	NA	17	120,000	Yes
85-68-7	Butyl Benzyl Phthalate	48 J	48 J	ug/kg	DSY-SB-09-1416	1/18	340 - 4000	48	NA	200	NA	No
218-01-9	Chrysene	51 J	1,300	ug/kg	N1-B	12/25	340 - 4000	1,300	NA	1,100	NA	Yes
53-70-3	Dibenzo(a,h)anthracene	46 J	46 J	ug/kg	N1-250	1/19	340 - 4000	46	NA	11	NA	Yes
206-44-0	Fluoranthene	41 J	4,400	ug/kg	N1-B	17/30	340 - 4000	4,400	NA	70,000	NA	No
86-73-7	Fluorene	44 J	730	ug/kg	N1-B	3/21	340 - 4000	730	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	62 J	240 J	ug/kg	S42 SWN	4/22	340 - 4000	240	NA	120	NA	Yes
91-20-3	Naphthalene	1 J	77 J	ug/kg	DPSOIL02	3/20	340 - 4000	77	NA	0.47	800	Yes
85-01-8	Phenanthrene	37 J	5,200	ug/kg	N1-B	14/26	340 - 4000	5,200	NA	9,500 ⁽⁹⁾	NA	No
129-00-0	Pyrene	34 J	3,000	ug/kg	N1-B	17/30	340 - 4000	3,000	NA	9,500	NA	No
Pesticides/PCBs												
72-54-8	4,4'-DDD	7.4 J	220 J	ug/kg	DSY-S-MW07-1618-D	3/18	3.4 - 5.3	220	NA	66	NA	Yes
72-55-9	4,4'-DDE	11 J	11 J	ug/kg	DSY-S-MW07-1618-D	1/18	3.4 - 5.3	11	NA	46	NA	No
50-29-3	4,4'-DDT	100 J	100 J	ug/kg	DSY-S-MW07-1618-D	1/18	3.4 - 5.3	100	NA	67	NA	Yes
11096-82-5	Aroclor-1260	13 J	13 J	ug/kg	DSY-S-TP25-1011	1/18	34 - 53	13	NA	24	NA	No
1336-36-3	Total Aroclors	58 P	100	ug/kg	S42 SWN	2/2	-	100	NA	26	10,000	Yes
72-20-8	Endrin	5.5	5.5	ug/kg	DSY-S-TP11-1213	1/18	3.4 - 5.3	5.5	NA	68	NA	No
Metals												
7429-90-5	Aluminum	4820	14,300	mg/kg	DSY-S-TP12-1213	27/27	-	14,300	13,075	23,000	NA	No
7440-38-2	Arsenic	3.9	37.3	mg/kg	DSY-S-TP12-1213	43/44	4.1 - 4.1	37.3	20	0.0013	NA	Yes
7440-39-3	Barium	6.3	37	mg/kg	S42 SWN	42/44	2.6 - 4.1	37	36	120	NA	No
7440-41-7	Beryllium	0.22 J	0.54	mg/kg	DSY-S-TP13-1011	23/27	0.18 - 0.23	0.54	0.64	13	NA	No
7440-43-9	Cadmium	0.7 J	2.8	mg/kg	N1-0	24/44	0.51 - 1.3	2.8	0.23	0.52	NA	Yes
7440-70-2	Calcium	363 J	3,630 J	mg/kg	DSY-SB-09-1416	27/27	-	3,630	1,689	NA	NA	No
7440-47-3	Chromium	6.3 J	22	mg/kg	N1-0	44/44	-	22	18	0.00059⁽¹⁰⁾	NA	Yes
7440-48-4	Cobalt	3.9 J	20.2 J	mg/kg	DSY-S-TP11-1213	27/27	-	20.2	17	0.21	NA	Yes
7440-50-8	Copper	5.1 J	27.9	mg/kg	DSY-S-TP25-0507	27/27	-	27.9	24	22	NA	Yes

TABLE 5-14
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - CENTRAL SHIPYARD
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Metals (continued)												
7439-89-6	Iron	14300	40,100	mg/kg	DSY-S-TP11-1213	27/27	-	40,100	39,173	270	NA	Yes
7439-92-1	Lead	2.1 J	45	mg/kg	N1-E	44/44	-	45	12	14 ⁽¹¹⁾	NA	Yes
7439-95-4	Magnesium	1900	4,530	mg/kg	DSY-S-TP12-1213	27/27	-	4,530	3,811	NA	NA	No
7439-96-5	Manganese	86.2 J	612 J	mg/kg	DSY-S-TP11-1213	27/27	-	612	1,037	21	NA	No
7439-97-6	Mercury	0.07	0.15	mg/kg	DSY-S-MW07-1618-D	2/27	0.04 - 0.13	0.15	0.012	0.033	NA	Yes
7440-02-0	Nickel	10.4 J	33.1	mg/kg	DSY-S-TP11-1213	27/27	-	33.1	28	20	NA	Yes
7440-09-7	Potassium	190	658	mg/kg	DSY-SB-14-0103-D	27/27	179 - 179	658	1,699	NA	NA	No
7782-49-2	Selenium	0.83 J	1.4	mg/kg	DSY-S-TP13-0506	4/25	0.68 - 1.1	1.4	0.286	0.4	NA	Yes
7440-22-4	Silver	1.6 J	5	mg/kg	N1-0	10/36	1 - 1.6	5	0.12	0.6	NA	Yes
7440-23-5	Sodium	82.8	228	mg/kg	DSY-S-MW07-3436	3/27	21.4 - 143	228	83	NA	NA	No
7440-62-2	Vanadium	8.9 J	22.8 J	mg/kg	DSY-SB-10-1416	27/27	-	22.8	23	78	NA	No
7440-66-6	Zinc	28 J	82.5	mg/kg	DSY-SB-03-0911	27/27	-	82.5	66	290	NA	No
Miscellaneous Parameters												
1461-25-2	Tetrabutyltin	4.6 J	27 J	ug/kg	DSY-S-TP13-0506	1/18	49 - 50	27	NA	NA	NA	No
56573-85-4	Tributyltin	4.9 J	4.9 J	ug/kg	DSY-S-MW05-1012	1/18	49 - 50	4.9	NA	NA	NA	No
TCLP Metals												
7440-38-2	Arsenic	4.2 J	67.2	ug/L	DSY-S-TP11-1213	9/18	4 - 24.3	67.2	NA	NA	NA	No
7440-39-3	Barium	283	415	ug/L	DSY-S-MW04-3234	3/18	75 - 806	415	NA	NA	23,000	No
7440-47-3	Chromium	7.3 J	29.5 J	ug/L	DSY-SB-10-1416	6/18	6 - 18.2	29.5	NA	NA	1,100	No
7439-92-1	Lead	5	56.2	ug/L	DSY-S-TP11-1213	5/18	1 - 38.1	56.2	NA	NA	40	Yes
7782-49-2	Selenium	18	18	ug/L	DSY-S-TP11-1213	1/18	4 - 6.9	18	NA	NA	600	No

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background concentration is upper prediction limit. See Appendix G.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - Value is for acenaphthene.
9 - Value is for pyrene.
10 - Value is for hexavalent chromium.
11 - Value is MCL based soil screening level.

Definitions:

J = Estimated value
NA = Not Applicable/Not Available

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

TABLE 5-14
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
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Associated Samples

DSY-S-MW04-3234	N1-A	DSY-SB-14-0103-D
DSY-S-MW05-1012	N1-B	DSY-SB-15-0103
DSY-S-MW05-2224	N1-C	DSY-S-TP11-0507
DSY-S-MW05-3234	N1-D	DSY-S-TP11-1213
DSY-S-MW05-4446	N1-E	DSY-S-TP12-0507
DSY-S-MW07-0810	S1	DSY-S-TP12-1213
DSY-S-MW07-1618	S42 BOT	DSY-S-TP13-0506
DSY-S-MW07-1618-D	S42 SWE	DSY-S-TP13-0506-D
DSY-S-MW07-2224	S42 SWN	DSY-S-TP13-1011
DSY-S-MW07-3436	S42 SWS	DSY-S-TP15-0506
N1-0	S42 SWW	DSY-S-TP15-1112
N1-100	DSY-SB-01-0911	DSY-S-TP17-0507
N1-150	DSY-SB-03-0911	DSY-S-TP17-1112
N1-200	DSY-SB-09-1416	DSY-S-TP25-0507
N1-250	DSY-SB-10-1416	DSY-S-TP25-1011
N1-50	DSY-SB-14-0103	DPSOIL02

TABLE 5-15
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Volatile Organic Compounds														
67-64-1	Acetone	3.28 J	3.28 J	ug/L	DSY-GW-MW219-031611-D	1/4	5 - 10	3.28	NA	1,200 N	NA NA	NA NA	No	BSL
Metals (Total)														
7429-90-5	Aluminum	52.9	1,240	ug/L	DSY-A-MW07-01	3/4	16 - 16	1,240	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	Yes	ASL
7440-38-2	Arsenic	27.8	78.1 J	ug/L	DSY-GW-MW219-031611-D	3/4	4 - 4	78.1	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
7440-39-3	Barium	34	86.6	ug/L	DSY-GW-MW218-030111	4/4	-	86.6	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
7440-43-9	Cadmium	1.41	1.53	ug/L	DSY-GW-MW219-031611	1/4	0.5 - 3	1.53	NA	0.69 N	5 5	EPA-MCL RIDEM	Yes	ASL
7440-70-2	Calcium	14,100	126,000	ug/L	DSY-A-MW05-01	4/4	-	126,000	NA	NA	NA NA	NA NA	No	NUT
7440-47-3	Chromium	12.8 J	12.8 J	ug/L	DSY-A-MW07-01	1/4	1 - 6	12.8	NA	0.031 C	100 100	EPA-MCL RIDEM	Yes	ASL
7440-48-4	Cobalt	13.7	24.8	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 4.5	24.8	NA	0.47 N	NA NA	NA NA	Yes	ASL
7439-89-6	Iron	1,260	65,800 J	ug/L	DSY-GW-MW219-031611-D	4/4	-	65,800	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
7439-92-1	Lead	1.07 J	1.8 J	ug/L	DSY-A-MW07-01	2/4	1 - 3.75	1.8	NA	NA	15 15	EPA-MCL RIDEM	No	BSL
7439-95-4	Magnesium	5,430	40,000	ug/L	DSY-A-MW05-01	4/4	-	40,000	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	753	9,100	ug/L	DSY-GW-MW218-030111	4/4	-	9,100	NA	32 N	50 NA	EPA-SDWR NA	Yes	ASL
7440-02-0	Nickel	4.64	4.64	ug/L	DSY-GW-MW218-030111	1/4	1.5 - 11.3	4.64	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	2,490	11,000	ug/L	DSY-GW-MW218-030111	4/4	-	11,000	NA	NA	NA NA	NA NA	No	NUT
7782-49-2	Selenium	1.24 J	1.55 J	ug/L	DSY-GW-MW219-031611	1/4	4 - 6.25	1.55	NA	7.8 N	50 50	EPA-MCL RIDEM	No	BSL
7440-23-5	Sodium	34,400	379,000	ug/L	DSY-A-MW05-01	4/4	-	379,000	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	1.52 J	3.59 J	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 26.4	3.59	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
Metals (Dissolved)														
7429-90-5	Aluminum	29.7 J	38 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	38	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	No	BSL
7440-38-2	Arsenic	29.1	78.9 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	78.9	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
7440-39-3	Barium	33.7	84.4	ug/L	DSY-GW-MW218-030111	2/2	-	84.4	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
7440-43-9	Cadmium	1.52	1.62	ug/L	DSY-GW-MW219-031611	1/2	0.5 - 0.5	1.62	NA	0.69 N	5 5	EPA-MCL RIDEM	Yes	ASL
7440-70-2	Calcium	39,000 J	76,600	ug/L	DSY-GW-MW218-030111	2/2	-	76,600	NA	NA	NA NA	NA NA	No	NUT

TABLE 5-15
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Dissolved Metals (Continued)														
7440-48-4	Cobalt	13.6	24.2	ug/L	DSY-GW-MW218-030111	2/2	-	24.2	NA	0.47 N	NA	NA	Yes	ASL
											NA	NA		
7439-89-6	Iron	9,900	63,900 J	ug/L	DSY-GW-MW219-031611	2/2	-	63,900	NA	1,100 N	300	EPA-SDWR	Yes	ASL
											NA	NA		
7439-92-1	Lead	0.488 J	0.667 J	ug/L	DSY-GW-MW219-031611	1/2	3.75 - 3.75	0.667	NA	NA	15 15	EPA-MCL RIDEM	No	BSL
7439-95-4	Magnesium	8,090 J	16,200	ug/L	DSY-GW-MW218-030111	2/2	-	16,200	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	4,610	8,680	ug/L	DSY-GW-MW218-030111	2/2	-	8,680	NA	32 N	50	EPA-SDWR	Yes	ASL
											NA	NA		
7440-02-0	Nickel	4.73	4.73	ug/L	DSY-GW-MW218-030111	1/2	1.75 - 1.75	4.73	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	6,240	10,800	ug/L	DSY-GW-MW218-030111	2/2	-	10,800	NA	NA	NA NA	NA NA	No	NUT
7782-49-2	Selenium	1.34 J	1.44 J	ug/L	DSY-GW-MW219-031611-D	1/2	6.25 - 6.25	1.44	NA	7.8 N	50 50	EPA-MCL RIDEM	No	BSL
7440-23-5	Sodium	35,800	61,900	ug/L	DSY-GW-MW218-030111	2/2	-	61,900	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	3.5 J	3.5 J	ug/L	DSY-GW-MW218-030111	1/2	2.5 - 2.5	3.5	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - No background data is available for groundwater.
- 5 - USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
- 6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-A-MW05-01
DSY-A-MW07-01
DSY-GW-MW218-030111
DSY-GW-MW219-031611
DSY-GW-MW219-031611-D
DSY-GW-MW219-031611-AVG

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)
EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
RIDEM = Rhode Island Department of Environmental Management GA Groundwater Objective (November, 2011).

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 5-16
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Screening Toxicity Value ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Volatile Organic Compounds														
67-64-1	Acetone	3.28 J	3.28 J	ug/L	DSY-GW-MW219-031611-D	1/4	5 - 10	3.28	NA	2,300,000 N	NA	NA	No	BSL
Metals														
7429-90-5	Aluminum	52.9	1,240	ug/L	DSY-A-MW07-01	3/4	16 - 16	1,240	NA	NA	NA	NA	No	NTX
7440-38-2	Arsenic	27.8	78.1 J	ug/L	DSY-GW-MW219-031611-D	3/4	4 - 4	78.1	NA	NA	NA	NA	No	NTX
7440-39-3	Barium	34	86.6	ug/L	DSY-GW-MW218-030111	4/4	-	86.6	NA	NA	NA	NA	No	NTX
7440-43-9	Cadmium	1.41	1.53	ug/L	DSY-GW-MW219-031611	1/4	0.5 - 3	1.53	NA	NA	NA	NA	No	NTX
7440-70-2	Calcium	14,100	126,000	ug/L	DSY-A-MW05-01	4/4	-	126,000	NA	NA	NA	NA	No	NUT
7440-47-3	Chromium	12.8 J	12.8 J	ug/L	DSY-A-MW07-01	1/4	1 - 6	12.8	NA	NA	NA	NA	No	NTX
7440-48-4	Cobalt	13.7	24.8	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 4.5	24.8	NA	NA	NA	NA	No	NTX
7439-89-6	Iron	1,260	65,800 J	ug/L	DSY-GW-MW219-031611-D	4/4	-	65,800	NA	NA	NA	NA	No	NTX
7439-92-1	Lead	1.07 J	1.8 J	ug/L	DSY-A-MW07-01	2/4	1 - 3.75	1.8	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	5,430	40,000	ug/L	DSY-A-MW05-01	4/4	-	40,000	NA	NA	NA	NA	No	NUT
7439-96-5	Manganese	753	9,100	ug/L	DSY-GW-MW218-030111	4/4	-	9,100	NA	NA	NA	NA	No	NTX
7440-02-0	Nickel	4.64	4.64	ug/L	DSY-GW-MW218-030111	1/4	1.5 - 11.3	4.64	NA	NA	NA	NA	No	NTX
7440-09-7	Potassium	2,490	11,000	ug/L	DSY-GW-MW218-030111	4/4	-	11,000	NA	NA	NA	NA	No	NUT
7782-49-2	Selenium	1.24 J	1.55 J	ug/L	DSY-GW-MW219-031611	1/4	4 - 6.25	1.55	NA	NA	NA	NA	No	NTX
7440-23-5	Sodium	34,400	379,000	ug/L	DSY-A-MW05-01	4/4	-	379,000	NA	NA	NA	NA	No	NUT
7440-66-6	Zinc	1.52 J	3.59 J	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 26.4	3.59	NA	NA	NA	NA	No	NTX
Dissolved Metals														
7429-90-5	Aluminum	29.7 J	38 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	38	NA	NA	NA	NA	No	NTX
7440-38-2	Arsenic	29.1	78.9 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	78.9	NA	NA	NA	NA	No	NTX
7440-39-3	Barium	33.7	84.4	ug/L	DSY-GW-MW218-030111	2/2	-	84.4	NA	NA	NA	NA	No	NTX
7440-43-9	Cadmium	1.52	1.62	ug/L	DSY-GW-MW219-031611	1/2	0.5 - 0.5	1.62	NA	NA	NA	NA	No	NTX
7440-70-2	Calcium	39,000 J	76,600	ug/L	DSY-GW-MW218-030111	2/2	-	76,600	NA	NA	NA	NA	No	NUT
7440-48-4	Cobalt	13.6	24.2	ug/L	DSY-GW-MW218-030111	2/2	-	24.2	NA	NA	NA	NA	No	NTX
7439-89-6	Iron	9,900	63,900 J	ug/L	DSY-GW-MW219-031611	2/2	-	63,900	NA	NA	NA	NA	No	NTX
7439-92-1	Lead	0.488 J	0.667 J	ug/L	DSY-GW-MW219-031611	1/2	3.75 - 3.75	0.667	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	8,090 J	16,200	ug/L	DSY-GW-MW218-030111	2/2	-	16,200	NA	NA	NA	NA	No	NUT
7439-96-5	Manganese	4,610	8,680	ug/L	DSY-GW-MW218-030111	2/2	-	8,680	NA	NA	NA	NA	No	NTX
7440-02-0	Nickel	4.73	4.73	ug/L	DSY-GW-MW218-030111	1/2	1.75 - 1.75	4.73	NA	NA	NA	NA	No	NTX
7440-09-7	Potassium	6,240	10,800	ug/L	DSY-GW-MW218-030111	2/2	-	10,800	NA	NA	NA	NA	No	NUT
7782-49-2	Selenium	1.34 J	1.44 J	ug/L	DSY-GW-MW219-031611-D	1/2	6.25 - 6.25	1.44	NA	NA	NA	NA	No	NTX
7440-23-5	Sodium	35,800	61,900	ug/L	DSY-GW-MW218-030111	2/2	-	61,900	NA	NA	NA	NA	No	NUT
7440-66-6	Zinc	3.5 J	3.5 J	ug/L	DSY-GW-MW218-030111	1/2	2.5 - 2.5	3.5	NA	NA	NA	NA	No	NTX

TABLE 5-16
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Screening Toxicity Value ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
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Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available for groundwater.
5 - USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-A-MW05-01	DSY-GW-MW218-030111	DSY-GW-MW219-031611-D
DSY-A-MW07-01	DSY-GW-MW219-031611	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
J = Estimated value
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient
NVT = Not sufficiently volatile and/or toxic to pose inhalation risk.

TABLE 5-17
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Volatile Organic Compounds													
108-88-3	Toluene	1 J	2 J	ug/kg	DSY-S-TP08-0001	2/7	10 - 11	2	NA	500,000 N	190,000	No	BSL
1330-20-7	Total Xylenes	3 J	3 J	ug/kg	DSY-S-MW08-SS01	1/7	10 - 11	3	NA	63,000 N	110,000	No	BSL
Semivolatile Organic Compounds													
83-32-9	Acenaphthene	46 J	52 J	ug/kg	DSY-S-MW08-SS01	2/7	340 - 1700	52	NA	340,000 N	43,000	No	BSL
120-12-7	Anthracene	51 J	110 J	ug/kg	DSY-S-MW08-SS01	3/7	340 - 1700	110	NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	60 J	470 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	470	NA	150 C	900	Yes	ASL
50-32-8	Benzo(a)pyrene	50 J	410 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	410	NA	15 C	400	Yes	ASL
205-99-2	Benzo(b)fluoranthene	36 J	660 J	ug/kg	DSY-S-MW09-0001	7/8	710 - 710	660	NA	150 C	900	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	48 J	190 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA	170,000 N ⁽⁸⁾	800	No	BSL
207-08-9	Benzo(k)fluoranthene	76 J	270 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	270	NA	1,500 C	900	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	3,000	8,700	ug/kg	DSY-S-TP07-0001	2/8	350 - 2700	8,700	NA	35,000 C	46,000	No	BSL
86-74-8	Carbazole	37 J	56 J	ug/kg	DSY-S-TP10-0001	2/7	340 - 1700	56	NA	NA	NA	No	NTX
218-01-9	Chrysene	41 J	580 J	ug/kg	DSY-S-MW09-0001	7/8	350 - 710	580	NA	15,000 C	400	Yes	ASL
53-70-3	Dibenzo(a,h)anthracene	62 J	62 J	ug/kg	DSY-S-MW09-0001	1/7	340 - 1700	62	NA	15 C	400	Yes	ASL
84-74-2	di-n-Butyl Phthalate	51 J	64 J	ug/kg	DSY-S-MW09-0001	2/7	340 - 1700	64	NA	610,000 N	NA	No	BSL
117-84-0	di-n-Octyl Phthalate	62 J	62 J	ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	62	NA	NA	NA	No	NTX
206-44-0	Fluoranthene	50 J	770 J	ug/kg	DSY-S-MW09-0001	6/8	710 - 1700	770	NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	50 J	50 J	ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	50	NA	230,000 N	28,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	48 J	190 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA	150 C	900	Yes	ASL
85-01-8	Phenanthrene	36 J	420 J	ug/kg	DSY-S-MW08-SS01	6/8	710 - 1700	420	NA	170,000 N ⁽⁸⁾	40,000	No	BSL
129-00-0	Pyrene	72 J	750 J	ug/kg	DSY-S-MW09-0001	7/8	710 - 710	750	NA	170,000 N	13,000	No	BSL
Pesticides/PCBs													
72-55-9	4,4'-DDE	4.5 J	4.5 J	ug/kg	DSY-S-TP08-0001-D	1/7	3.4 - 3.6	4.5	NA	1,400 C	NA	No	BSL
50-29-3	4,4'-DDT	5 J	8.9	ug/kg	DSY-S-TP08-0001	3/7	3.4 - 3.6	8.9	NA	1,700 C	NA	No	BSL
11097-69-1	Aroclor-1254	38 J	38 J	ug/kg	DSY-S-MW08-SS01	1/7	34 - 36	38	NA	110 N ⁽⁹⁾	NA	No	BSL
11096-82-5	Aroclor-1260	24 J	24 J	ug/kg	DSY-S-TP10-0001	1/7	34 - 36	24	NA	220 C	NA	No	BSL
5103-74-2	gamma-Chlordane	3.9	3.9	ug/kg	DSY-S-TP10-0001	1/7	1.7 - 1.9	3.9	NA	16,000 C ⁽¹⁰⁾	NA	No	BSL
76-44-8	Heptachlor	4.5	4.5	ug/kg	DSY-S-TP10-0001	1/7	1.7 - 1.9	4.5	NA	110 C	NA	No	BSL
Metals													
7429-90-5	Aluminum	3,810	11,300	mg/kg	DSY-S-TP09-0001	7/7	-	11,300	16,020	7,700 N	NA	No	BKG
7440-38-2	Arsenic	2.6	23.6	mg/kg	DSY-S-TP09-0001	8/8	-	23.6	13	0.39 C	7	Yes	ASL
7440-39-3	Barium	8.9	180	mg/kg	MW09TP01	8/8	-	180	51	1,500 N	5,500	No	BSL
7440-41-7	Beryllium	0.18 J	3.5	mg/kg	DSY-S-MW08-SS01	6/7	0.2 - 0.2	3.5	0.58	16 N	1.5	Yes	ASL
7440-43-9	Cadmium	13	13	mg/kg	MW09TP01	1/8	0.47 - 0.61	13	0.17	7 N	39	Yes	ASL
7440-70-2	Calcium	521	2,790	mg/kg	DSY-S-MW08-SS01	7/7	-	2,790	1,598	NA	NA	No	NUT
7440-47-3	Chromium	6.4 J	130	mg/kg	MW09TP01	8/8	-	130	16	0.29 C ⁽¹¹⁾	390 ⁽¹¹⁾	Yes	ASL
7440-48-4	Cobalt	3.3	23.9	mg/kg	DSY-S-MW08-SS01	7/7	-	23.9	9	2.3 N	NA	Yes	ASL
7440-50-8	Copper	12.9	262	mg/kg	DSY-S-MW08-SS01	7/7	-	262	12.4	310 N	3,100	No	BSL
7439-89-6	Iron	7,770	37,200	mg/kg	DSY-S-TP09-0001	7/7	-	37,200	24,200	5,500 N	NA	Yes	ASL
7439-92-1	Lead	9.7 J	189 J	mg/kg	DSY-S-MW08-SS01	8/8	-	189	40	400	150	Yes	ASL
7439-95-4	Magnesium	1,170	3,380	mg/kg	DSY-S-TP09-0001	7/7	-	3,380	2,571	NA	NA	No	NUT
7439-96-5	Manganese	157	597	mg/kg	DSY-S-TP09-0001	7/7	-	597	349	180 N	390	Yes	ASL
7439-97-6	Mercury	0.07	0.07	mg/kg	DSY-S-MW08-SS01	1/7	0.05 - 0.09	0.07	0.18	2.3 N ⁽¹²⁾	23	No	BSL, BKG
7440-02-0	Nickel	7.8 J	113	mg/kg	DSY-S-MW08-SS01	7/7	-	113	15	150 N	1,000	No	BSL

TABLE 5-17
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Metals (Continued)													
7440-09-7	Potassium	227	397	mg/kg	DSY-S-TP26-0001	7/7	-	397	651	NA	NA	No	NUT, BKG
7782-49-2	Selenium	3	3	mg/kg	MW09TP01	1/8	0.63 - 0.81	3	0.57	39 N	390	No	BSL
7440-23-5	Sodium	19 J	163 J	mg/kg	DSY-S-MW08-SS01	5/7	20.5 - 45.1	163	231	NA	NA	No	NUT, BKG
7440-62-2	Vanadium	6.8 J	23.2 J	mg/kg	DSY-S-TP10-0001	7/7	-	23.2	34	39 N	550	No	BSL, BKG
7440-66-6	Zinc	44.3 J	831 J	mg/kg	DSY-S-MW08-SS01	7/7	-	831	62	2,300 N	6,000	No	BSL
Miscellaneous Parameters													
1461-25-2	Tetrabutyltin	11.4 J	11.4 J	ug/kg	DSY-S-TP09-0001	1/7	49 - 50	11.4	NA	1,800 N ⁽¹³⁾	NA	No	BSL
56573-85-4	Tributyltin	2.1 J	6.9 J	ug/kg	DSY-S-MW08-SS01	2/7	49 - 50	6.9	NA	1,800 N	NA	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Value is for pyrene.
- 9 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 10 - Value is for chlordane.
- 11 - Value is for hexavalent chromium.
- 12 - Value is for mercuric chloride (and other mercury salts).
- 13 - Value is for dibutyltin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-S-MW08-SS01
DSY-S-MW09-0001
MW09TP01
DSY-S-TP07-0001
DSY-S-TP08-0001
DSY-S-TP08-0001-D
DSY-S-TP09-0001
DSY-S-TP10-0001
DSY-S-TP26-0001

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 5-18
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Volatile Organic Compounds												
108-88-3	Toluene	1 J	2 J	ug/kg	DSY-S-TP08-0001	2/7	10 - 11	2	NA	590	32,000	No
1330-20-7	Total Xylenes	3 J	3 J	ug/kg	DSY-S-MW08-SS01	1/7	10 - 11	3	NA	190	540,000	No
Semivolatile Organic Compounds												
83-32-9	Acenaphthene	46 J	52 J	ug/kg	DSY-S-MW08-SS01	2/7	340 - 1700	52	NA	4,100	NA	No
120-12-7	Anthracene	51 J	110 J	ug/kg	DSY-S-MW08-SS01	3/7	340 - 1700	110	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	60 J	470 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	470	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	50 J	410 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	410	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	36 J	660 J	ug/kg	DSY-S-MW09-0001	7/8	710 - 710	660	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	48 J	190 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA	9,500 ⁽⁷⁾	NA	No
207-08-9	Benzo(k)fluoranthene	76 J	270 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	270	NA	350	NA	No
117-81-7	Bis(2-ethylhexyl)phthalate	3,000	8,700	ug/kg	DSY-S-TP07-0001	2/8	350 - 2700	8700	NA	17	120,000	Yes
86-74-8	Carbazole	37 J	56 J	ug/kg	DSY-S-TP10-0001	2/7	340 - 1700	56	NA	NA	NA	No
218-01-9	Chrysene	41 J	580 J	ug/kg	DSY-S-MW09-0001	7/8	350 - 710	580	NA	1,100	NA	No
53-70-3	Dibenzo(a,h)anthracene	62 J	62 J	ug/kg	DSY-S-MW09-0001	1/7	340 - 1700	62	NA	11	NA	Yes
84-74-2	di-n-Butyl Phthalate	51 J	64 J	ug/kg	DSY-S-MW09-0001	2/7	340 - 1700	64	NA	1,700	NA	No
117-84-0	di-n-Octyl Phthalate	62 J	62 J	ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	62	NA	NA	NA	No
206-44-0	Fluoranthene	50 J	770 J	ug/kg	DSY-S-MW09-0001	6/8	710 - 1700	770	NA	70,000	NA	No
86-73-7	Fluorene	50 J	50 J	ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	50	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	48 J	190 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA	120	NA	Yes
85-01-8	Phenanthrene	36 J	420 J	ug/kg	DSY-S-MW08-SS01	6/8	710 - 1700	420	NA	9,500 ⁽⁷⁾	NA	No
129-00-0	Pyrene	72 J	750 J	ug/kg	DSY-S-MW09-0001	7/8	710 - 710	750	NA	9,500	NA	No
Pesticides/PCBs												
72-55-9	4,4'-DDE	4.5 J	4.5 J	ug/kg	DSY-S-TP08-0001-D	1/7	3.4 - 3.6	4.5	NA	46	NA	No
50-29-3	4,4'-DDT	5 J	8.9	ug/kg	DSY-S-TP08-0001	3/7	3.4 - 3.6	8.9	NA	67	NA	No
11097-69-1	Aroclor-1254	38 J	38 J	ug/kg	DSY-S-MW08-SS01	1/7	34 - 36	38	NA	8.8	NA	Yes
11096-82-5	Aroclor-1260	24 J	24 J	ug/kg	DSY-S-TP10-0001	1/7	34 - 36	24	NA	24	NA	No
5103-74-2	gamma-Chlordane	3.9	3.9	ug/kg	DSY-S-TP10-0001	1/7	1.7 - 1.9	3.9	NA	1.8 ⁽⁸⁾	NA	Yes
76-44-8	Heptachlor	4.5	4.5	ug/kg	DSY-S-TP10-0001	1/7	1.7 - 1.9	4.5	NA	0.14	NA	Yes
Metals												
7429-90-5	Aluminum	3,810	11,300	mg/kg	DSY-S-TP09-0001	7/7	-	11300	16,020	23,000	NA	No
7440-38-2	Arsenic	2.6	23.6	mg/kg	DSY-S-TP09-0001	8/8	-	23.6	13	0.0013	NA	Yes
7440-39-3	Barium	8.9	180	mg/kg	MW09TP01	8/8	-	180	51	120	NA	Yes
7440-41-7	Beryllium	0.18 J	3.5	mg/kg	DSY-S-MW08-SS01	6/7	0.2 - 0.2	3.5	0.58	13	NA	No
7440-43-9	Cadmium	13	13	mg/kg	MW09TP01	1/8	0.47 - 0.61	13	0.17	0.52	NA	Yes
7440-70-2	Calcium	521	2,790	mg/kg	DSY-S-MW08-SS01	7/7	-	2790	1,598	NA	NA	No
7440-47-3	Chromium	6.4 J	130	mg/kg	MW09TP01	8/8	-	130	16	0.00059 ⁽⁹⁾	NA	Yes
7440-48-4	Cobalt	3.3	23.9	mg/kg	DSY-S-MW08-SS01	7/7	-	23.9	9	0.21	NA	Yes
7440-50-8	Copper	12.9	262	mg/kg	DSY-S-MW08-SS01	7/7	-	262	12.4	22	NA	Yes
7439-89-6	Iron	7,770	37,200	mg/kg	DSY-S-TP09-0001	7/7	-	37200	24,200	270	NA	Yes
7439-92-1	Lead	9.7 J	189 J	mg/kg	DSY-S-MW08-SS01	8/8	-	189	40	14 ⁽¹⁰⁾	NA	Yes
7439-95-4	Magnesium	1,170	3,380	mg/kg	DSY-S-TP09-0001	7/7	-	3380	2,571	NA	NA	No
7439-96-5	Manganese	157	597	mg/kg	DSY-S-TP09-0001	7/7	-	597	349	21	NA	Yes
7439-97-6	Mercury	0.07	0.07	mg/kg	DSY-S-MW08-SS01	1/7	0.05 - 0.09	0.07	0.18	0.033	NA	No

TABLE 5-18
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Metals (Continued)												
7440-02-0	Nickel	7.8 J	113	mg/kg	DSY-S-MW08-SS01	7/7	-	113	15	20	NA	Yes
7440-09-7	Potassium	227	397	mg/kg	DSY-S-TP26-0001	7/7	-	397	651	NA	NA	No
7782-49-2	Selenium	3	3	mg/kg	MW09TP01	1/8	0.63 - 0.81	3	0.57	0.4	NA	Yes
7440-23-5	Sodium	19 J	163 J	mg/kg	DSY-S-MW08-SS01	5/7	20.5 - 45.1	163	231	NA	NA	No
7440-62-2	Vanadium	6.8 J	23.2 J	mg/kg	DSY-S-TP10-0001	7/7	-	23.2	34	78	NA	No
7440-66-6	Zinc	44.3 J	831 J	mg/kg	DSY-S-MW08-SS01	7/7	-	831	62	290	NA	Yes
Miscellaneous Parameters												
1461-25-2	Tetrabutyltin	11.4 J	11.4 J	ug/kg	DSY-S-TP09-0001	1/7	49 - 50	11.4	NA	NA	NA	No
56573-85-4	Tributyltin	2.1 J	6.9 J	ug/kg	DSY-S-MW08-SS01	2/7	49 - 50	6.9	NA	NA	NA	No
TCLP Metals												
7440-39-3	Barium	90.7	456	ug/L	DSY-S-TP08-0001-D	5/7	129 - 272	456	NA	NA	23,000	No
7440-43-9	Cadmium	4 J	4 J	ug/L	DSY-S-MW08-SS01	1/7	3 - 3	4	NA	NA	30	No
7440-47-3	Chromium	8.7 J	52.4 J	ug/L	DSY-S-TP08-0001-D	2/7	6 - 6	52.4	NA	NA	1,100	No
7439-92-1	Lead	9.6 J	114	ug/L	DSY-S-TP08-0001-D	6/7	2.5 - 2.5	114	NA	NA	40	Yes
7782-49-2	Selenium	8.1	8.1	ug/L	DSY-S-TP26-0001	1/7	4 - 5.9	8.1	NA	NA	600	No

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background concentration is upper prediction limit. See Appendix G.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
7 - Value is for pyrene.
8 - Value is for chlordane.
9 - Value is for hexavalent chromium.
10 - Value is MCL based soil screening level.

Definitions:

- C = Carcinogen
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

Associated Samples

DSY-S-MW08-SS01	DSY-S-TP08-0001-D
DSY-S-MW09-0001	DSY-S-TP09-0001
MW09TP01	DSY-S-TP10-0001
DSY-S-TP07-0001	DSY-S-TP26-0001
DSY-S-TP08-0001	

TABLE 5-19
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Volatile Organic Compounds													
71-43-2	Benzene	1 J	1 J	ug/kg	DSY-SB-06-0204	1/10	10 - 110	1	NA	1,100 C	2,500	No	BSL
100-41-4	Ethylbenzene	66 J	66 J	ug/kg	DSY-S-TP26-0305	1/10	10 - 12	66	NA	5,400 C	71,000	No	BSL
108-88-3	Toluene	1 J	1 J	ug/kg	DSY-SB-06-0204	1/10	10 - 110	1	NA	500,000 N	190,000	No	BSL
540-59-0	Total 1,2-Dichloroethene	1 J	3 J	ug/kg	DSY-S-MW08-0810	2/10	10 - 110	3	NA	70,000 N	630,000	No	BSL
1330-20-7	Total Xylenes	150	150	ug/kg	DSY-S-TP26-0305	1/10	10 - 12	150	NA	63,000 N	110,000	No	BSL
79-01-6	Trichloroethene	3 J	3 J	ug/kg	DSY-S-MW08-0810	1/10	10 - 110	3	NA	440 N ⁽⁸⁾	13,000	No	BSL
Semivolatile Organic Compounds													
91-57-6	2-Methylnaphthalene	14,000	14,000	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	14,000	NA	23,000 N	123,000	No	BSL
120-12-7	Anthracene	900 J	900 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	900	NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	48 J	70 J	ug/kg	DSY-S-MW09-1012-D	2/10	340 - 3900	70	NA	150 C	900	No	BSL
50-32-8	Benzo(a)pyrene	41 J	55 J	ug/kg	DSY-S-TP08-0406	2/10	340 - 3900	55	NA	15 C	400	Yes	ASL
205-99-2	Benzo(b)fluoranthene	63 J	80 J	ug/kg	DSY-S-TP08-0406	2/10	340 - 3900	80	NA	150 C	900	No	BSL
191-24-2	Benzo(g,h,i)perylene	45 J	45 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	45	NA	170,000 N ⁽⁹⁾	800	No	BSL
207-08-9	Benzo(k)fluoranthene	68 J	68 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	68	NA	1,500 C	900	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	22,000	22,000	ug/kg	DSY-S-TP08-0910	1/10	340 - 3900	22,000	NA	35,000 C	46,000	No	BSL
218-01-9	Chrysene	41 J	54 J	ug/kg	DSY-S-MW09-1012, DSY-S-TP08-0406	2/10	340 - 3900	54	NA	15,000 C	400	No	BSL
84-74-2	di-n-Butyl Phthalate	50 J	50 J	ug/kg	DSY-SB-04-0406	1/10	340 - 3900	50	NA	610,000 N	NA	No	BSL
206-44-0	Fluoranthene	100 J	130 J	ug/kg	DSY-S-MW09-1012, DSY-S-MW09-1012-D	3/10	360 - 3900	130	NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	2,100 J	2,100 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	2,100	NA	230,000 N	28,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	41 J	41 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	41	NA	150 C	900	No	BSL
91-20-3	Naphthalene	2,200 J	2,200 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	2,200	NA	3,600 C	54,000	No	BSL
85-01-8	Phenanthrene	51 J	4,800	ug/kg	DSY-S-TP26-0305	4/10	360 - 3600	4,800	NA	170,000 N ⁽⁹⁾	40,000	No	BSL
129-00-0	Pyrene	87 J	460 J	ug/kg	DSY-S-TP26-0305	4/10	360 - 3600	460	NA	170,000 N	13,000	No	BSL
Pesticides/PCBs													
76-44-8	Heptachlor	4	4	ug/kg	DSY-S-TP26-0305	1/10	1.7 - 2.5	4	NA	110 C	NA	No	BSL
Metals													
7429-90-5	Aluminum	1,690	23,300	mg/kg	DSY-S-TP09-0910	16/16	-	23,300	13,075	7,700 N	NA	Yes	ASL
7440-38-2	Arsenic	1.2 J	42	mg/kg	DSY-S-TP26-0406	15/16	3.5 - 3.5	42	20	0.39 C	7	Yes	ASL
7440-39-3	Barium	3.1 J	33.6	mg/kg	DSY-S-TP26-0910	16/16	-	33.6	36	1,500 N	5,500	No	BSL, BKG
7440-41-7	Beryllium	0.2 J	0.67	mg/kg	DSY-S-TP08-0406	11/16	0.17 - 0.23	0.67	0.64	16 N	1.5	No	BSL
7440-43-9	Cadmium	0.66 J	0.66 J	mg/kg	DSY-S-TP10-1213	1/16	0.51 - 0.69	0.66	0.23	7 N	39	No	BSL
7440-70-2	Calcium	322 J	5,190	mg/kg	DSY-S-MW09-3638	16/16	-	5,190	1,689	NA	NA	No	NUT
7440-47-3	Chromium	2.2 J	60.2	mg/kg	DSY-SB-06-0204	16/16	-	60.2	18	0.29 C ⁽¹⁰⁾	390 ⁽¹⁰⁾	Yes	ASL
7440-48-4	Cobalt	1.1 J	25	mg/kg	DSY-S-TP09-0910	15/16	3.9 - 3.9	25	17	2.3 N	NA	Yes	ASL
7440-50-8	Copper	4.1	46.1	mg/kg	DSY-S-TP08-0406	16/16	-	46.1	24	310 N	3,100	No	BSL
7439-89-6	Iron	4,060	50,000	mg/kg	DSY-S-TP09-0910	16/16	-	50,000	39,173	5,500 N	NA	Yes	ASL
7439-92-1	Lead	1.5 J	75 J	mg/kg	DSY-S-TP26-0406	15/16	1.3 - 1.3	75	12	400	150	No	BSL
7439-95-4	Magnesium	534	8,600	mg/kg	DSY-S-TP09-0910	16/16	-	8,600	3,811	NA	NA	No	NUT
7439-96-5	Manganese	78.6 J	2,450	mg/kg	DSY-S-TP09-0910	16/16	-	2,450	1,037	180 N	390	Yes	ASL
7439-97-6	Mercury	0.06	0.06	mg/kg	DSY-S-TP26-0406	1/16	0.05 - 0.06	0.06	0.012	2.3 N ⁽¹¹⁾	23	No	BSL
7440-02-0	Nickel	2.3 J	48.1	mg/kg	DSY-S-TP09-0910	15/16	7.2 - 7.2	48.1	28	150 N	1,000	No	BSL

TABLE 5-19
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Metals (Continued)													
7440-09-7	Potassium	108	593	mg/kg	DSY-S-MW09-2022	16/16	-	593	1,699	NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.81 J	1.4 J	mg/kg	DSY-S-TP09-0406	2/16	0.68 - 0.92	1.4	0.286 0.12 83	39 N	390	No	BSL
7440-22-4	Silver	1.6 J	1.6 J	mg/kg	DSY-S-TP09-0910	1/16	1 - 1.4	1.6		39 N	200	No	BSL
7440-23-5	Sodium	14.5 J	353	mg/kg	DSY-S-TP08-0910	9/15	17 - 68.8	353		NA	NA	No	NUT
7440-62-2	Vanadium	4.4 J	19.6 J	mg/kg	DSY-S-TP09-0406	16/16	-	19.6	23	39 N	550	No	BSL, BKG
7440-66-6	Zinc	10 J	158	mg/kg	DSY-S-TP08-0406	16/16	-	158	66	2,300 N	6,000	No	BSL
Miscellaneous Parameters													
1461-25-2	Tetrabutyltin	2.9 J	2.9 J	ug/kg	DSY-S-TP08-0910	1/10	49 - 50	2.9	NA	1,800 N ⁽¹²⁾	NA	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 - Value is for pyrene.
- 10 - Value is for hexavalent chromium.
- 11 - Value is for mercuric chloride (and other mercury salts).
- 12 - Value is for dibutyltin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-S-MW08-0810	DSY-S-TP08-0910
DSY-S-MW09-1012	DSY-S-TP09-0406
DSY-S-MW09-1012-D	DSY-S-TP09-0910
DSY-S-MW09-2022	DSY-S-TP10-0507
DSY-S-MW09-3032	DSY-S-TP10-1213
DSY-S-MW09-3638	DSY-S-TP26-0305
DSY-SB-04-0406	DSY-S-TP26-0406
DSY-SB-06-0204	DSY-S-TP26-0910
DSY-S-TP08-0406	

Definitions:

- C = Carcinogen
- COPC = Chemical Of Potential Concern
- J = Estimated value
- N = Noncarcinogen
- NA = Not Applicable/Not Available

Rationale Codes:

- For selection as a COPC:
- ASL = Above Screening Level.

- For elimination as a COPC:
- BKG = Within Background Levels
- BSL = Below COPC Screening Level
- NTX = No toxicity criteria
- NUT = Essential nutrient

TABLE 5-20
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Volatile Organic Compounds												
71-43-2	Benzene	1 J	1 J	ug/kg	DSY-SB-06-0204	1/10	10 - 110	1	NA	0.2	200	Yes
100-41-4	Ethylbenzene	66 J	66 J	ug/kg	DSY-S-TP26-0305	1/10	10 - 12	66	NA	1.5	27,000	Yes
108-88-3	Toluene	1 J	1 J	ug/kg	DSY-SB-06-0204	1/10	10 - 110	1	NA	590	32	No
540-59-0	Total 1,2-Dichloroethene	1 J	3 J	ug/kg	DSY-S-MW08-0810	2/10	10 - 110	3	NA	37	NA	No
1330-20-7	Total Xylenes	150	150	ug/kg	DSY-S-TP26-0305	1/10	10 - 12	150	NA	190	540	No
79-01-6	Trichloroethene	3 J	3 J	ug/kg	DSY-S-MW08-0810	1/10	10 - 110	3	NA	0.16	200	Yes
Semivolatile Organic Compounds												
91-57-6	2-Methylnaphthalene	14,000	14,000	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	14,000	NA	140	NA	Yes
120-12-7	Anthracene	900 J	900 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	900	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	48 J	70 J	ug/kg	DSY-S-MW09-1012-D	2/10	340 - 3900	70	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	41 J	55 J	ug/kg	DSY-S-TP08-0406	2/10	340 - 3900	55	NA	3.5	240	Yes
205-99-2	Benzo(b)fluoranthene	63 J	80 J	ug/kg	DSY-S-TP08-0406	2/10	340 - 3900	80	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	45 J	45 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	45	NA	9,500 ⁽⁷⁾	NA	No
207-08-9	Benzo(k)fluoranthene	68 J	68 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	68	NA	350	NA	No
117-81-7	Bis(2-ethylhexyl)phthalate	22,000	22,000	ug/kg	DSY-S-TP08-0910	1/10	340 - 3900	22,000	NA	17	120,000	Yes
218-01-9	Chrysene	41 J	54 J	ug/kg	DSY-S-MW09-1012, DSY-S-TP08-0406	2/10	340 - 3900	54	NA	1,100	NA	No
84-74-2	di-n-Butyl Phthalate	50 J	50 J	ug/kg	DSY-SB-04-0406	1/10	340 - 3900	50	NA	1,700	NA	No
206-44-0	Fluoranthene	100 J	130 J	ug/kg	DSY-S-MW09-1012, DSY-S-MW09-1012-D	3/10	360 - 3900	130	NA	70,000	NA	No
86-73-7	Fluorene	2,100 J	2,100 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	2,100	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	41 J	41 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	41	NA	120	NA	No
91-20-3	Naphthalene	2,200 J	2,200 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	2,200	NA	0.47	800	Yes
85-01-8	Phenanthrene	51 J	4,800	ug/kg	DSY-S-TP26-0305	4/10	360 - 3600	4,800	NA	9,500 ⁽⁷⁾	NA	No
129-00-0	Pyrene	87 J	460 J	ug/kg	DSY-S-TP26-0305	4/10	360 - 3600	460	NA	9,500	NA	No
Pesticides/PCBs												
76-44-8	Heptachlor	4	4	ug/kg	DSY-S-TP26-0305	1/10	1.7 - 2.5	4	NA	0.14	NA	Yes
Metals												
7429-90-5	Aluminum	1,690	23,300	mg/kg	DSY-S-TP09-0910	16/16	-	23,300	13,075	23,000	NA	Yes
7440-38-2	Arsenic	1.2 J	42	mg/kg	DSY-S-TP26-0406	15/16	3.5 - 3.5	42	20	0.0013	NA	Yes
7440-39-3	Barium	3.1 J	33.6	mg/kg	DSY-S-TP26-0910	16/16	-	33.6	36	120	NA	No
7440-41-7	Beryllium	0.2 J	0.67	mg/kg	DSY-S-TP08-0406	11/16	0.17 - 0.23	0.67	0.64	13	NA	No
7440-43-9	Cadmium	0.66 J	0.66 J	mg/kg	DSY-S-TP10-1213	1/16	0.51 - 0.69	0.66	0.23	0.52	NA	Yes
7440-70-2	Calcium	322 J	5,190	mg/kg	DSY-S-MW09-3638	16/16	-	5,190	1,689	NA	NA	No
7440-47-3	Chromium	2.2 J	60.2	mg/kg	DSY-SB-06-0204	16/16	-	60.2	18	0.00059 ⁽⁸⁾	NA	Yes
7440-48-4	Cobalt	1.1 J	25	mg/kg	DSY-S-TP09-0910	15/16	3.9 - 3.9	25	17	0.21	NA	Yes
7440-50-8	Copper	4.1	46.1	mg/kg	DSY-S-TP08-0406	16/16	-	46.1	24	22	NA	Yes
7439-89-6	Iron	4,060	50,000	mg/kg	DSY-S-TP09-0910	16/16	-	50,000	39,173	270	NA	Yes
7439-92-1	Lead	1.5 J	75 J	mg/kg	DSY-S-TP26-0406	15/16	1.3 - 1.3	75	12	14 ⁽⁹⁾	NA	Yes
7439-95-4	Magnesium	534	8,600	mg/kg	DSY-S-TP09-0910	16/16	-	8,600	3,811	NA	NA	No
7439-96-5	Manganese	78.6 J	2,450	mg/kg	DSY-S-TP09-0910	16/16	-	2,450	1,037	21	NA	Yes
7439-97-6	Mercury	0.06	0.06	mg/kg	DSY-S-TP26-0406	1/16	0.05 - 0.06	0.06	0.012	0.033	NA	Yes

TABLE 5-20
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Metals (Continued)												
7440-02-0	Nickel	2.3 J	48.1	mg/kg	DSY-S-TP09-0910	15/16	7.2 - 7.2	48.1	28	20	NA	Yes
7440-09-7	Potassium	108	593	mg/kg	DSY-S-MW09-2022	16/16	-	593	1,699	NA	NA	No
7782-49-2	Selenium	0.81 J	1.4 J	mg/kg	DSY-S-TP09-0406	2/16	0.68 - 0.92	1.4	0.286	0.4	NA	Yes
7440-22-4	Silver	1.6 J	1.6 J	mg/kg	DSY-S-TP09-0910	1/16	1 - 1.4	1.6	0.12	0.6	NA	Yes
7440-23-5	Sodium	14.5 J	353	mg/kg	DSY-S-TP08-0910	9/15	17 - 68.8	353	83	NA	NA	No
7440-62-2	Vanadium	4.4 J	19.6 J	mg/kg	DSY-S-TP09-0406	16/16	-	19.6	23	78	NA	No
7440-66-6	Zinc	10 J	158	mg/kg	DSY-S-TP08-0406	16/16	-	158	66	290	NA	No
Miscellaneous Parameters												
1461-25-2	Tetrabutyltin	2.9 J	2.9 J	ug/kg	DSY-S-TP08-0910	1/10	49 - 50	2.9	NA	NA	NA	No
TCLP Metals												
7440-39-3	Barium	69.9	133	ug/L	DSY-S-TP26-0305	3/10	61.5 - 123	133	NA	NA	23,000	No
7440-47-3	Chromium	129	129	ug/L	DSY-SB-06-0204	1/10	6 - 7.4	129	NA	NA	1,100	No
7439-92-1	Lead	15.8 J	21.8 J	ug/L	DSY-S-MW09-1012-D	1/10	1 - 5.4	21.8	NA	NA	40	No

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background concentration is upper prediction limit. See Appendix G.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
7 - Value is for pyrene.
8 - Value is for hexavalent chromium.
9 - Value is MCL based soil screening level.

Definitions:

- C = Carcinogen
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

Associated Samples

DSY-S-MW08-0810	DSY-S-TP08-0910
DSY-S-MW09-1012	DSY-S-TP09-0406
DSY-S-MW09-1012-D	DSY-S-TP09-0910
DSY-S-MW09-2022	DSY-S-TP10-0507
DSY-S-MW09-3032	DSY-S-TP10-1213
DSY-S-MW09-3638	DSY-S-TP26-0305
DSY-SB-04-0406	DSY-S-TP26-0406
DSY-SB-06-0204	DSY-S-TP26-0910
DSY-S-TP08-0406	

TABLE 5-21
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 3

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Volatile Organic Compounds														
75-35-4	1,1-Dichloroethene	0.25 J	0.25 J	ug/L	DSY-GW-MW08-030111	1/4	10 - 10	0.25	NA	26 N	7 7	EPA-MCL RIDEM	No	BSL
156-59-2	cis-1,2-Dichloroethene	12.7	12.7	ug/L	DSY-GW-MW08-030111	1/1	-	12.7	NA	2.8 N	70 70	EPA-MCL RIDEM	Yes	ASL
79-01-6	Trichloroethene	3 J	4 J	ug/L	DSY-A-MW08-01	3/4	10 - 10	4	NA	0.26 N ⁽⁷⁾	5 5	EPA-MCL RIDEM	Yes	ASL
75-69-4	Trichlorofluoromethane	0.581 J	0.581 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.581	NA	110 N	NA NA	NA NA	No	BSL
75-01-4	Vinyl Chloride	0.263 J	100	ug/L	DSY-A-MW104-01	2/4	10 - 10	100	NA	0.015 C	2 2	EPA-MCL RIDEM	Yes	ASL
Metals (Total)														
7429-90-5	Aluminum	53.7	1,010	ug/L	DSY-A-MW09-01	2/4	33.7 - 102	1,010	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	Yes	ASL
7440-38-2	Arsenic	1.32 J	19.8	ug/L	DSY-A-MW104-01	3/4	4 - 4	19.8	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
7440-39-3	Barium	17	99.3	ug/L	DSY-A-MW09-01	3/4	11.5 - 33.9	99.3	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
7440-43-9	Cadmium	0.286 J	0.286 J	ug/L	DSY-GW-MW08-030111	1/4	3 - 3	0.286	NA	0.69 N	5 5	EPA-MCL RIDEM	No	BSL
7440-70-2	Calcium	28,400	46,900	ug/L	DSY-A-MW104-01	4/4	-	46,900	NA	NA	NA NA	NA NA	No	NUT
7440-47-3	Chromium	7.2 J	57.6 J	ug/L	DSY-A-MW09-01	3/4	1 - 1	57.6	NA	0.031 C	100 100	EPA-MCL RIDEM	Yes	ASL
7440-48-4	Cobalt	1.74 J	1.74 J	ug/L	DSY-GW-MW08-030111	1/4	3.4 - 18.5	1.74	NA	0.47 N	NA NA	NA NA	Yes	ASL
7440-50-8	Copper	1.57 J	12.7	ug/L	DSY-A-MW104-01	3/4	5 - 5	12.7	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
7439-89-6	Iron	459	5,660	ug/L	DSY-A-MW08-01	4/4	140 - 140	5,660	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
7439-92-1	Lead	14.6	14.6	ug/L	DSY-A-MW104-01	1/4	0.75 - 1	14.6	NA	NA	15 15	EPA-MCL RIDEM	No	BSL
7439-95-4	Magnesium	6,530	13,400	ug/L	DSY-A-MW08-01-D	4/4	-	13,400	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	20.5	4,300	ug/L	DSY-A-MW104-01	4/4	-	4,300	NA	32 N	50 NA	EPA-SDWR NA	Yes	ASL
7440-02-0	Nickel	2.08 J	2.08 J	ug/L	DSY-GW-MW08-030111	1/4	9 - 34.6	2.08	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	1,440	7,650	ug/L	DSY-A-MW09-01	4/4	-	7,650	NA	NA	NA NA	NA NA	No	NUT
7440-23-5	Sodium	32,000	119,000	ug/L	DSY-A-MW104-01	4/4	-	119,000	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	29.8 J	29.8 J	ug/L	DSY-GW-MW08-030111	1/4	14.2 - 52.1	29.8	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL

TABLE 5-21
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Metals (Dissolved)														
7429-90-5	Aluminum	36.6 J	36.6 J	ug/L	DSY-GW-MW08-030111	1/1	-	36.6	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	No	BSL
7440-38-2	Arsenic	1.37 J	1.37 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.37	NA	0.045 C	10 10	EPA-MCL RIDEM	Yes	ASL
7440-39-3	Barium	16.1	16.1	ug/L	DSY-GW-MW08-030111	1/1	-	16.1	NA	290 N	2,000 2,000	EPA-MCL RIDEM	No	BSL
7440-43-9	Cadmium	0.274 J	0.274 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.274	NA	0.69 N	5 5	EPA-MCL RIDEM	No	BSL
7440-70-2	Calcium	47,800	47,800	ug/L	DSY-GW-MW08-030111	1/1	-	47,800	NA	NA	NA NA	NA NA	No	NUT
7440-48-4	Cobalt	1.78 J	1.78 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.78	NA	0.47 N	NA NA	NA NA	Yes	ASL
7440-50-8	Copper	1.17 J	1.17 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.17	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
7439-89-6	Iron	423	423	ug/L	DSY-GW-MW08-030111	1/1	-	423	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
7439-95-4	Magnesium	9,790	9,790	ug/L	DSY-GW-MW08-030111	1/1	-	9,790	NA	NA	NA NA	NA NA	No	NUT
7439-96-5	Manganese	531	531	ug/L	DSY-GW-MW08-030111	1/1	-	531	NA	32 N	50 NA	EPA-SDWR NA	Yes	ASL
7440-02-0	Nickel	1.75 J	1.75 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.75	NA	30 N	NA 100	NA RIDEM	No	BSL
7440-09-7	Potassium	5,010	5,010	ug/L	DSY-GW-MW08-030111	1/1	-	5,010	NA	NA	NA NA	NA NA	No	NUT
7440-23-5	Sodium	114,000	114,000	ug/L	DSY-GW-MW08-030111	1/1	-	114,000	NA	NA	NA NA	NA NA	No	NUT
7440-66-6	Zinc	16.6	16.6	ug/L	DSY-GW-MW08-030111	1/1	-	16.6	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
Miscellaneous Parameters														
- -	Monobutyltin	0.16 J	0.16 J	ug/L	DSY-A-MW08-01-D	1/3	1 - 1	0.16	NA	NA	NA NA	NA NA	No	NTX

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available for groundwater.
5 - USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)
EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
RIDEM = Rhode Island Department of Environmental Management GA Groundwater Objective (February, 2004).

TABLE 5-21
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
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Associated Samples

DSY-A-MW08-01
DSY-A-MW08-01-D
DSY-A-MW09-01
DSY-A-MW104-01
DSY-GW-MW08-030111

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 5-22
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Vapor Intrusion Criteria ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Volatile Organic Compounds														
75-35-4	1,1-Dichloroethene	0.25 J	0.25 J	ug/L	DSY-GW-MW08-030111	1/4	10 - 10	0.25	NA	20 N	NA	NA	No	BSL
156-59-2	cis-1,2-Dichloroethene	12.7	12.7	ug/L	DSY-GW-MW08-030111	1/1	-	12.7	NA	NA	NA	NA	No	NTX
79-01-6	Trichloroethene	3 J	4 J	ug/L	DSY-A-MW08-01	3/4	10 - 10	4	NA	0.52 N ⁽⁷⁾	NA	NA	Yes	ASL
75-69-4	Trichlorofluoromethane	0.581 J	0.581 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.581	NA	18 N	NA	NA	No	BSL
75-01-4	Vinyl Chloride	0.263 J	100	ug/L	DSY-A-MW104-01	2/4	10 - 10	100	NA	0.14 C	NA	NA	Yes	ASL
Metals														
7429-90-5	Aluminum	53.7	1,010	ug/L	DSY-A-MW09-01	2/4	33.7 - 102	1,010	NA	NA	NA	NA	No	NTX
7440-38-2	Arsenic	1.32 J	19.8	ug/L	DSY-A-MW104-01	3/4	4 - 4	19.8	NA	NA	NA	NA	No	NTX, BKG
7440-39-3	Barium	17	99.3	ug/L	DSY-A-MW09-01	3/4	11.5 - 33.9	99.3	NA	NA	NA	NA	No	NTX
7440-43-9	Cadmium	0.286 J	0.286 J	ug/L	DSY-GW-MW08-030111	1/4	3 - 3	0.286	NA	NA	NA	NA	No	NTX
7440-70-2	Calcium	28,400	46,900	ug/L	DSY-A-MW104-01	4/4	-	46,900	NA	NA	NA	NA	No	NUT
7440-47-3	Chromium	7.2 J	57.6 J	ug/L	DSY-A-MW09-01	3/4	1 - 1	57.6	NA	NA	NA	NA	No	NTX
7440-48-4	Cobalt	1.74 J	1.74 J	ug/L	DSY-GW-MW08-030111	1/4	3.4 - 18.5	1.74	NA	NA	NA	NA	No	NTX
7440-50-8	Copper	1.57 J	12.7	ug/L	DSY-A-MW104-01	3/4	5 - 5	12.7	NA	NA	NA	NA	No	NTX
7439-89-6	Iron	459	5,660	ug/L	DSY-A-MW08-01	4/4	140 - 140	5,660	NA	NA	NA	NA	No	NTX
7439-92-1	Lead	14.6	14.6	ug/L	DSY-A-MW104-01	1/4	0.75 - 1	14.6	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	6,530	13,400	ug/L	DSY-A-MW08-01-D	4/4	-	13,400	NA	NA	NA	NA	No	NUT
7439-96-5	Manganese	20.5	4,300	ug/L	DSY-A-MW104-01	4/4	-	4,300	NA	NA	NA	NA	No	NTX
7440-02-0	Nickel	2.08 J	2.08 J	ug/L	DSY-GW-MW08-030111	1/4	9 - 34.6	2.08	NA	NA	NA	NA	No	NTX
7440-09-7	Potassium	1,440	7,650	ug/L	DSY-A-MW09-01	4/4	-	7,650	NA	NA	NA	NA	No	NUT
7440-23-5	Sodium	32,000	119,000	ug/L	DSY-A-MW104-01	4/4	-	119,000	NA	NA	NA	NA	No	NUT
7440-66-6	Zinc	29.8 J	29.8 J	ug/L	DSY-GW-MW08-030111	1/4	14.2 - 52.1	29.8	NA	NA	NA	NA	No	NTX
Dissolved Metals														
7429-90-5	Aluminum	36.6 J	36.6 J	ug/L	DSY-GW-MW08-030111	1/1	-	36.6	NA	NA	NA	NA	No	NTX
7440-38-2	Arsenic	1.37 J	1.37 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.37	NA	NA	NA	NA	No	NTX, BKG
7440-39-3	Barium	16.1	16.1	ug/L	DSY-GW-MW08-030111	1/1	-	16.1	NA	NA	NA	NA	No	NTX
7440-43-9	Cadmium	0.274 J	0.274 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.274	NA	NA	NA	NA	No	NTX
7440-70-2	Calcium	47,800	47,800	ug/L	DSY-GW-MW08-030111	1/1	-	47,800	NA	NA	NA	NA	No	NUT
7440-48-4	Cobalt	1.78 J	1.78 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.78	NA	NA	NA	NA	No	NTX
7440-50-8	Copper	1.17 J	1.17 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.17	NA	NA	NA	NA	No	NTX
7439-89-6	Iron	423	423	ug/L	DSY-GW-MW08-030111	1/1	-	423	NA	NA	NA	NA	No	NTX
7439-95-4	Magnesium	9,790	9,790	ug/L	DSY-GW-MW08-030111	1/1	-	9,790	NA	NA	NA	NA	No	NUT
7439-96-5	Manganese	531	531	ug/L	DSY-GW-MW08-030111	1/1	-	531	NA	NA	NA	NA	No	NTX
7440-02-0	Nickel	1.75 J	1.75 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.75	NA	NA	NA	NA	No	NTX
7440-09-7	Potassium	5,010	5,010	ug/L	DSY-GW-MW08-030111	1/1	-	5,010	NA	NA	NA	NA	No	NUT
7440-23-5	Sodium	114,000	114,000	ug/L	DSY-GW-MW08-030111	1/1	-	114,000	NA	NA	NA	NA	No	NUT
7440-66-6	Zinc	16.6	16.6	ug/L	DSY-GW-MW08-030111	1/1	-	16.6	NA	NA	NA	NA	No	NTX
Miscellaneous Parameters														
--	Monobutyltin	0.16 J	0.16 J	ug/L	DSY-A-MW08-01-D	1/3	1 - 1	0.16	NA	NA	NA	NA	No	NTX

TABLE 5-22
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - No background data is available for groundwater.
- 5 - USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

- DSY-A-MW08-01
- DSY-A-MW08-01-D
- DSY-A-MW09-01
- DSY-A-MW104-01
- DSY-GW-MW08-030111

Definitions:

- ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
- C = Carcinogen
- CAS = Chemical Abstracts Service
- COPC = Chemical Of Potential Concern
- J = Estimated value
- NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:

- ASL = Above Screening Level.

For elimination as a COPC:

- BKG = Within Background Levels
- BSL = Below COPC Screening Level
- NTX = No toxicity criteria
- NUT = Essential nutrient

TABLE 5-23
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - SOUTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Polycyclic Aromatic Hydrocarbons													
205-99-2	Benzo(b)fluoranthene	43 J	43 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	43	NA	150 C	900	No	BSL
206-44-0	Fluoranthene	59 J	59 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	59	NA	230,000 N	20,000	No	BSL
129-00-0	Pyrene	67 J	67 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	67	NA	170,000 N	13,000	No	BSL
Metals													
7429-90-5	Aluminum	5,860	17,400	mg/kg	DSY-SB201-SO-0204	6/6	-	17400	13075	7,700 N	NA	Yes	ASL
7440-38-2	Arsenic	7.7 J	26.3	mg/kg	DSY-SB202-SO-0204	6/6	-	26.3	20	0.39 C	7	Yes	ASL
7440-39-3	Barium	13.9	18 J	mg/kg	DSY-S-TP02-1516	5/6	2.9 - 2.9	18	36	1,500 N	5,500	No	BSL, BKG
7440-41-7	Beryllium	0.34 J	0.418 J	mg/kg	DSY-SB201-SO-0204	5/6	0.21 - 0.21	0.418	0.64	16 N	1.5	No	BSL, BKG
7440-43-9	Cadmium	0.56 J	0.56 J	mg/kg	DSY-S-TP06-1213	1/6	0.214 - 0.63	0.56	0.23	7 N	39	No	BSL
7440-70-2	Calcium	812	3,490	mg/kg	DSY-S-TP02-1516	6/6	-	3490	1689	NA	NA	No	NUT
7440-47-3	Chromium	6.6 J	21.2	mg/kg	DSY-SB201-SO-0204	6/6	-	21.2	18	0.29 C ⁽⁸⁾	390 ⁽⁸⁾	Yes	ASL
7440-48-4	Cobalt	4.4 J	29.9	mg/kg	DSY-S-TP05-1213	6/6	-	29.9	17	2.3 N	NA	Yes	ASL
7440-50-8	Copper	7 J	29.9 J	mg/kg	DSY-SB201-SO-0204	6/6	-	29.9	24	310 N	3,100	No	BSL
7439-89-6	Iron	16,800	45,500	mg/kg	DSY-SB202-SO-0204	6/6	-	45500	39173	5,500 N	NA	Yes	ASL
7439-92-1	Lead	7.6 J	34.2 J	mg/kg	DSY-S-TP02-1516	6/6	-	34.2	12	400	150	No	BSL
7439-95-4	Magnesium	2,230	5,220	mg/kg	DSY-SB201-SO-0204	6/6	-	5220	3811	NA	NA	No	NUT
7439-96-5	Manganese	104 J	800	mg/kg	DSY-S-TP05-1213	6/6	-	800	1,037	180 N	390	No	BKG
7440-02-0	Nickel	10.7 J	38.6	mg/kg	DSY-SB201-SO-0204	6/6	-	38.6	28	150 N	1,000	No	BSL
7440-09-7	Potassium	121 J	365	mg/kg	DSY-S-TP05-1213	6/6	-	365	1,699	NA	NA	No	NUT, BKG
7440-23-5	Sodium	9 J	23 J	mg/kg	DSY-S-TP05-1213	2/6	36.7 - 342	23	83	NA	NA	No	NUT, BKG
7440-62-2	Vanadium	9	18.6	mg/kg	DSY-SB201-SO-0204	6/6	-	18.6	23	39 N	550	No	BSL, BKG
7440-66-6	Zinc	52.5 J	75.7 J	mg/kg	DSY-SB202-SO-0204	6/6	-	75.7	66	2,300 N	6,000	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Value is for hexavalent chromium.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-SB201-SO-0204	DSY-S-TP02-1516
DSY-SB202-SO-0204	DSY-S-TP05-1213
DSY-S-TP01-1112	DSY-S-TP06-1213

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 5-24
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - SOUTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Polycyclic Aromatic Hydrocarbons												
205-99-2	Benzo(b)fluoranthene	43 J	43 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	43	NA	35	NA	Yes
206-44-0	Fluoranthene	59 J	59 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	59	NA	70,000	NA	No
129-00-0	Pyrene	67 J	67 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	67	NA	9,500	NA	No
Metals												
7429-90-5	Aluminum	5,860	17,400	mg/kg	DSY-SB201-SO-0204	6/6	-	17,400	13075	23,000	NA	No
7440-38-2	Arsenic	7.7 J	26.3	mg/kg	DSY-SB202-SO-0204	6/6	-	26.3	20	0.0013	NA	Yes
7440-39-3	Barium	13.9	18 J	mg/kg	DSY-S-TP02-1516	5/6	2.9 - 2.9	18	36	120	NA	No
7440-41-7	Beryllium	0.34 J	0.418 J	mg/kg	DSY-SB201-SO-0204	5/6	0.21 - 0.21	0.418	0.64	13	NA	No
7440-43-9	Cadmium	0.56 J	0.56 J	mg/kg	DSY-S-TP06-1213	1/6	0.214 - 0.63	0.56	0.23	0.52	NA	Yes
7440-70-2	Calcium	812	3,490	mg/kg	DSY-S-TP02-1516	6/6	-	3,490	1689	NA	NA	No
7440-47-3	Chromium	6.6 J	21.2	mg/kg	DSY-SB201-SO-0204	6/6	-	21.2	18	0.00059 ⁽⁸⁾	NA	Yes
7440-48-4	Cobalt	4.4 J	29.9	mg/kg	DSY-S-TP05-1213	6/6	-	29.9	17	0.21	NA	Yes
7440-50-8	Copper	7 J	29.9 J	mg/kg	DSY-SB201-SO-0204	6/6	-	29.9	24	22	NA	Yes
7439-89-6	Iron	16,800	45,500	mg/kg	DSY-SB202-SO-0204	6/6	-	45,500	39173	270	NA	Yes
7439-92-1	Lead	7.6 J	34.2 J	mg/kg	DSY-S-TP02-1516	6/6	-	34.2	12	14 ⁽⁹⁾	NA	Yes
7439-95-4	Magnesium	2,230	5,220	mg/kg	DSY-SB201-SO-0204	6/6	-	5,220	3811	NA	NA	No
7439-96-5	Manganese	104 J	800	mg/kg	DSY-S-TP05-1213	6/6	-	800	1,037	21	NA	No
7440-02-0	Nickel	10.7 J	38.6	mg/kg	DSY-SB201-SO-0204	6/6	-	38.6	28	20	NA	Yes
7440-09-7	Potassium	121 J	365	mg/kg	DSY-S-TP05-1213	6/6	-	365	1,699	NA	NA	No
7440-23-5	Sodium	9 J	23 J	mg/kg	DSY-S-TP05-1213	2/6	36.7 - 342	23	83	NA	NA	No
7440-62-2	Vanadium	9	18.6	mg/kg	DSY-SB201-SO-0204	6/6	-	18.6	23	78	NA	No
7440-66-6	Zinc	52.5 J	75.7 J	mg/kg	DSY-SB202-SO-0204	6/6	-	75.7	66	290	NA	No

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background concentration is upper prediction limit. See Appendix G.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
7 - Value is for hexavalent chromium.
8 - Value is MCL based soil screening level.

Definitions:

J = Estimated value
NA = Not Applicable/Not Available

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

Associated Samples

DSY-SB201-SO-0204	DSY-S-TP02-1516
DSY-SB202-SO-0204	DSY-S-TP05-1213
DSY-S-TP01-1112	DSY-S-TP06-1213

TABLE 5-25
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Polycyclic Aromatic Hydrocarbons													
91-57-6	2-Methylnaphthalene	18.8 J	299	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	299	NA	23,000 N	123,000	No	BSL
83-32-9	Acenaphthene	10 J	1,000	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	1,000	NA	340,000 N	43,000	No	BSL
208-96-8	Acenaphthylene	695	695	ug/kg	DSY-SO-SB209-0.30.7	1/3	3.94 - 360	695	NA	340,000 N ⁽⁸⁾	23,000	No	BSL
120-12-7	Anthracene	45.1 J	2,290	ug/kg	DSY-SO-SB209-0.30.7	2/3	3.94 - 360	2,290	NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	42 J	5,740	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	5,740	NA	150 C	900	Yes	ASL
50-32-8	Benzo(a)pyrene	46.3 J	4,920	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	4,920	NA	15 C	400	Yes	ASL
205-99-2	Benzo(b)fluoranthene	50 J	7,120	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	7,120	NA	150 C	900	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	28.4 J	2,070	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,070	NA	170,000 N ⁽⁹⁾	800	Yes	ASL
207-08-9	Benzo(k)fluoranthene	28.8 J	2,480	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,480	NA	1,500 C	900	Yes	ASL
218-01-9	Chrysene	45 J	5,650	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	5,650	NA	15,000 C	400	Yes	ASL
53-70-3	Dibenzo(a,h)anthracene	10.1 J	820	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	820	NA	15 C	400	Yes	ASL
206-44-0	Fluoranthene	82 J	13,400	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	13,400	NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	6.3 J	1,220	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	1,220	NA	230,000 N	28,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	23.5 J	2,070	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,070	NA	150 C	900	Yes	ASL
91-20-3	Naphthalene	14.7 J	751	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	751	NA	3,600 C	54,000	No	BSL
85-01-8	Phenanthrene	60 J	9,530	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	9,530	NA	170,000 N ⁽⁹⁾	40,000	No	BSL
129-00-0	Pyrene	58 J	10,100	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	10,100	NA	170,000 N	13,000	No	BSL
Pesticides/PCBs													
11096-82-5	Aroclor-1260	24.2 J	416 J	ug/kg	DSY-SO-SB209-0.30.7	2/7	17.2 - 36	416	NA	220 C	NA	Yes	ASL
1336-36-3	Total Aroclors	24.2 J	416 J	ug/kg	DSY-SO-SB209-0.30.7	2/6	17.2 - 18.1	416	NA	220 C	10,000	Yes	ASL
Metals													
7429-90-5	Aluminum	9,120	12,300	mg/kg	DSY-S-MW06-SS01	3/3	-	12,300	16,020	7,700 N	NA	No	BKG
7440-38-2	Arsenic	10.4	21.8 J	mg/kg	DSY-SO-SB208-000.5	4/4	-	21.8	13	0.39 C	7	Yes	ASL
7440-39-3	Barium	14.8 J	35.4 J	mg/kg	DSY-SO-SB208-000.5-D	4/4	-	35.4	51	1,500 N	5,500	No	BSL, BKG
7440-41-7	Beryllium	0.45	0.576	mg/kg	DSY-SO-SB208-000.5-D	3/3	-	0.576	0.58	16 N	1.5	No	BSL, BKG
7440-43-9	Cadmium	0.232 J	1.4	mg/kg	B6-S1	2/4	0.122 - 0.61	1.4	0.17	7 N	39	No	BSL
7440-70-2	Calcium	416 J	1,180	mg/kg	DSY-S-MW06-SS01	3/3	-	1,180	1,598	NA	NA	No	NUT, BKG
7440-47-3	Chromium	10 J	15.8 J	mg/kg	DSY-S-MW06-SS01	4/4	-	15.8	16	0.29 C ⁽¹⁰⁾	390 ⁽¹⁰⁾	No	BKG
7440-48-4	Cobalt	8.62 J	22.7	mg/kg	DSY-S-MW06-SS01	3/3	-	22.7	9	2.3 N	NA	Yes	ASL
7440-50-8	Copper	23.4 J	33.5 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	-	33.5	12.4	310 N	3,100	No	BSL
7439-89-6	Iron	22,500	32,000	mg/kg	DSY-SO-SB208-000.5	3/3	-	32,000	24,200	5,500 N	NA	Yes	ASL
7439-92-1	Lead	16.4 J	26.5 J	mg/kg	DSY-SO-SB209-0.30.7	4/4	-	26.5	40	400	150	No	BSL, BKG
7439-95-4	Magnesium	2,840	4,090	mg/kg	DSY-S-MW06-SS01	3/3	-	4,090	2,571	NA	NA	No	NUT
7439-96-5	Manganese	293	619	mg/kg	DSY-S-MW06-SS01	3/3	-	619	349	180 N	390	Yes	ASL
7439-97-6	Mercury	0.0168 J	0.0247 J	mg/kg	DSY-SO-SB208-000.5	2/3	0.0359 - 0.05	0.0247	0.18	2.3 N ⁽¹¹⁾	23	No	BSL, BKG
7440-02-0	Nickel	21.1	26.3	mg/kg	DSY-SO-SB208-000.5-D	3/3	-	26.3	15	150 N	1,000	No	BSL
7440-09-7	Potassium	282	394 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	904 - 904	394	651	NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.301 J	0.631	mg/kg	DSY-SO-SB208-000.5-D	2/3	0.82 - 1.51	0.631	0.57	39 N	390	No	BSL
7440-23-5	Sodium	71.4 J	71.4 J	mg/kg	DSY-SO-SB209-0.30.7	1/2	182 - 904	71.4	231	NA	NA	No	NUT, BKG
7440-62-2	Vanadium	14.2	25.1	mg/kg	DSY-SO-SB208-000.5	3/3	-	25.1	34	39 N	550	No	BSL, BKG
7440-66-6	Zinc	75.5 J	137 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	-	137	62	2,300 N	6,000	No	BSL

TABLE 5-25
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Value is for acenaphthene.
- 9 - Value is for pyrene.
- 10 - Value is for hexavalent chromium.
- 11 - Value is for mercuric chloride (and other mercury salts).

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

- DSY-S-MW06-SS01
- DSY-SO-SB208-000.5
- DSY-SO-SB208-000.5-D
- DSY-SO-SB209-0.30.7
- DSY-SO-SB215-000.5
- DSY-SO-SB216-000.5
- DSY-SO-SB217-000.5
- DSY-SO-SB224-000.5
- DSY-SO-SB224-000.5-D
- B6-S1

Definitions:

- C = Carcinogen
- COPC = Chemical Of Potential Concern
- J = Estimated value
- N = Noncarcinogen
- NA = Not Applicable/Not Available

Rationale Codes:

- For selection as a COPC:
 - ASL = Above Screening Level.

- For elimination as a COPC:
 - BKG = Within Background Levels
 - BSL = Below COPC Screening Level
 - NTX = No toxicity criteria
 - NUT = Essential nutrient

TABLE 5-26
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Polycyclic Aromatic Hydrocarbons												
91-57-6	2-Methylnaphthalene	18.8 J	299	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	299	NA	140	NA	Yes
83-32-9	Acenaphthene	10 J	1,000	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	1,000	NA	4,100	NA	No
208-96-8	Acenaphthylene	695	695	ug/kg	DSY-SO-SB209-0.30.7	1/3	3.94 - 360	695	NA	4,100 ⁽⁷⁾	NA	No
120-12-7	Anthracene	45.1 J	2,290	ug/kg	DSY-SO-SB209-0.30.7	2/3	3.94 - 360	2,290	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	42 J	5,740	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	5,740	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	46.3 J	4,920	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	4,920	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	50 J	7,120	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	7,120	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	28.4 J	2,070	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,070	NA	9,500 ⁽⁸⁾	NA	No
207-08-9	Benzo(k)fluoranthene	28.8 J	2,480	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,480	NA	350	NA	Yes
218-01-9	Chrysene	45 J	5,650	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	5,650	NA	1,100	NA	Yes
53-70-3	Dibenzo(a,h)anthracene	10.1 J	820	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	820	NA	11	NA	Yes
206-44-0	Fluoranthene	82 J	13,400	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	13,400	NA	70,000	NA	No
86-73-7	Fluorene	6.3 J	1,220	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	1,220	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	23.5 J	2,070	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,070	NA	120	NA	Yes
91-20-3	Naphthalene	14.7 J	751	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	751	NA	0.47	800	Yes
85-01-8	Phenanthrene	60 J	9,530	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	9,530	NA	9,500 ⁽⁸⁾	NA	Yes
129-00-0	Pyrene	58 J	10,100	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	10,100	NA	9,500	NA	Yes
Pesticides/PCBs												
11096-82-5	Aroclor-1260	24.2 J	416 J	ug/kg	DSY-SO-SB209-0.30.7	2/7	17.2 - 36	416	NA	24	NA	Yes
1336-36-3	Total Aroclors	24.2 J	416 J	ug/kg	DSY-SO-SB209-0.30.7	2/6	17.2 - 18.1	416	NA	26	10,000	Yes
Metals												
7429-90-5	Aluminum	9,120	12,300	mg/kg	DSY-S-MW06-SS01	3/3	-	12,300	16,020	23,000	NA	No
7440-38-2	Arsenic	10.4	21.8 J	mg/kg	DSY-SO-SB208-000.5	4/4	-	21.8	13	0.0013	NA	Yes
7440-39-3	Barium	14.8 J	35.4 J	mg/kg	DSY-SO-SB208-000.5-D	4/4	-	35.4	51	120	NA	No
7440-41-7	Beryllium	0.45	0.576	mg/kg	DSY-SO-SB208-000.5-D	3/3	-	0.576	0.58	13	NA	No
7440-43-9	Cadmium	0.232 J	1.4	mg/kg	B6-S1	2/4	0.122 - 0.61	1.4	0.17	0.52	NA	Yes
7440-70-2	Calcium	416 J	1,180	mg/kg	DSY-S-MW06-SS01	3/3	-	1,180	1,598	NA	NA	No
7440-47-3	Chromium	10 J	15.8 J	mg/kg	DSY-S-MW06-SS01	4/4	-	15.8	16	0.00059 ⁽⁹⁾	NA	No
7440-48-4	Cobalt	8.62 J	22.7	mg/kg	DSY-S-MW06-SS01	3/3	-	22.7	9	0.21	NA	Yes
7440-50-8	Copper	23.4 J	33.5 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	-	33.5	12.4	22	NA	Yes
7439-89-6	Iron	22,500	32,000	mg/kg	DSY-SO-SB208-000.5	3/3	-	32,000	24,200	270	NA	Yes
7439-92-1	Lead	16.4 J	26.5 J	mg/kg	DSY-SO-SB209-0.30.7	4/4	-	26.5	40	14 ⁽¹⁰⁾	NA	Yes
7439-95-4	Magnesium	2,840	4,090	mg/kg	DSY-S-MW06-SS01	3/3	-	4,090	2,571	NA	NA	No
7439-96-5	Manganese	293	619	mg/kg	DSY-S-MW06-SS01	3/3	-	619	349	21	NA	Yes
7439-97-6	Mercury	0.0168 J	0.0247 J	mg/kg	DSY-SO-SB208-000.5	2/3	0.0359 - 0.05	0.0247	0.18	0.033	NA	No
7440-02-0	Nickel	21.1	26.3	mg/kg	DSY-SO-SB208-000.5-D	3/3	-	26.3	15	20	NA	Yes
7440-09-7	Potassium	282	394 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	904 - 904	394	651	NA	NA	No
7782-49-2	Selenium	0.301 J	0.631	mg/kg	DSY-SO-SB208-000.5-D	2/3	0.82 - 1.51	0.631	0.57	0.4	NA	Yes
7440-23-5	Sodium	71.4 J	71.4 J	mg/kg	DSY-SO-SB209-0.30.7	1/2	182 - 904	71.4	231	NA	NA	No
7440-62-2	Vanadium	14.2	25.1	mg/kg	DSY-SO-SB208-000.5	3/3	-	25.1	34	78	NA	No
7440-66-6	Zinc	75.5 J	137 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	-	137	62	290	NA	No
TCLP Metals												
7440-47-3	Chromium	13.6	13.6	ug/L	DSY-S-MW06-SS01	1/1	-	13.6	NA	NA	1,100	No

TABLE 5-26
COMPARISON OF CHEMICAL CONCENTRATIONS TO SCREENING CRITERIA FOR MIGRATION FROM SURFACE SOIL TO GROUNDWATER - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
- 6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 7 - Value is for acenaphthene.
- 8 - Value is for pyrene.
- 9 - Value is for hexavalent chromium.
- 10 - Value is MCL based soil screening level.

Definitions:

- J = Estimated value
- NA = Not Applicable/Not Available

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

Associated Samples

- DSY-S-MW06-SS01
- DSY-SO-SB208-000.5
- DSY-SO-SB208-000.5-D
- DSY-SO-SB209-0.30.7
- DSY-SO-SB215-000.5
- DSY-SO-SB216-000.5
- DSY-SO-SB217-000.5
- DSY-SO-SB224-000.5
- DSY-SO-SB224-000.5-D
- B6-S1

TABLE 5-27
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Polycyclic Aromatic Hydrocarbons													
91-57-6	2-Methylnaphthalene	3.38 J	281	ug/kg	DSY-SO-SB214-0203	3/6	3.83 - 360	281	NA	23,000 N	123,000	No	BSL
83-32-9	Acenaphthene	2.87 J	2.87 J	ug/kg	DSY-SO-SB213-0203	1/6	3.53 - 360	2.87	NA	340,000 N	43,000	No	BSL
208-96-8	Acenaphthylene	3.5 J	47.2	ug/kg	DSY-SO-SB214-0203	4/6	3.9 - 360	47.2	NA	340,000 N ⁽⁸⁾	23,000	No	BSL
120-12-7	Anthracene	4.71 J	17.2	ug/kg	DSY-SO-SB212-0204	3/6	4.11 - 360	17.2	NA	1,700,000 N	35,000	No	BSL
56-55-3	Benzo(a)anthracene	32.5	252	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	252	NA	150 C	900	Yes	ASL
50-32-8	Benzo(a)pyrene	18.9	172	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	172	NA	15 C	400	Yes	ASL
205-99-2	Benzo(b)fluoranthene	26.6	336	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	336	NA	150 C	900	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	10.7 J	91.1	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	91.1	NA	170,000 N ⁽⁹⁾	800	No	BSL
207-08-9	Benzo(k)fluoranthene	11.3 J	124	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	124	NA	1,500 C	900	No	BSL
218-01-9	Chrysene	20.5	356	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	356	NA	15,000 C	400	No	BSL
53-70-3	Dibenzo(a,h)anthracene	7.48 J	43.7	ug/kg	DSY-SO-SB214-0203	3/6	3.83 - 360	43.7	NA	15 C	400	Yes	ASL
206-44-0	Fluoranthene	39.6	451	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	451	NA	230,000 N	20,000	No	BSL
86-73-7	Fluorene	2.22 J	8.85 J	ug/kg	DSY-SO-SB212-0204	3/6	4.11 - 360	8.85	NA	230,000 N	28,000	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	10.2 J	82.7	ug/kg	DSY-SO-SB214-0203	5/6	360 - 360	82.7	NA	150 C	900	No	BSL
91-20-3	Naphthalene	2.5 J	175	ug/kg	DSY-SO-SB214-0203	4/6	3.9 - 360	175	NA	3,600 C	54,000	No	BSL
85-01-8	Phenanthrene	24.8	400	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	400	NA	170,000 N ⁽⁹⁾	40,000	No	BSL
129-00-0	Pyrene	33.9	375	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	375	NA	170,000 N	13,000	No	BSL
Pesticides/PCBs													
1336-36-3	Total Aroclors	95	95	ug/kg	B6-S6	1/6	17.2 - 26.9	95	NA	220 C	10,000	No	BSL
Metals													
7429-90-5	Aluminum	2,180	19,900	mg/kg	DSY-S-MW06-0406	6/6	-	19,900	13,075	7,700 N	NA	Yes	ASL
7440-36-0	Antimony	1.15 J	1.15 J	mg/kg	DSY-SO-SB214-0203	1/6	0.428 - 17.6	1.15	ND	3.1 N	10	No	BSL
7440-38-2	Arsenic	1.47 J	47.2 J	mg/kg	DSY-SO-SB214-0203	7/7	-	47.2	20	0.39 C	7	Yes	ASL
7440-39-3	Barium	5.5 J	57.7 J	mg/kg	DSY-SO-SB214-0203	6/6	-	57.7	36	1,500 N	5,500	No	BSL
7440-41-7	Beryllium	0.507 J	0.759	mg/kg	DSY-SO-SB214-0203	5/6	0.34 - 0.34	0.759	0.64	16 N	1.5	No	BSL
7440-43-9	Cadmium	0.0903 J	1.4	mg/kg	B6-S6	2/7	0.107 - 1	1.4	0.23	7 N	39	No	BSL
7440-70-2	Calcium	279 J	2,040 J	mg/kg	DSY-SO-SB214-0203	6/6	-	2,040	1,689	NA	NA	No	NUT
7440-47-3	Chromium	0.788 J	25.6 J	mg/kg	DSY-S-MW06-0406	7/7	-	25.6	18	0.29 C⁽¹⁰⁾	390 ⁽¹⁰⁾	Yes	ASL
7440-48-4	Cobalt	1.29 J	24	mg/kg	DSY-S-MW06-0406	6/6	-	24	17	2.3 N	NA	Yes	ASL
7440-50-8	Copper	1.67 J	39.5 J	mg/kg	DSY-SO-SB214-0203	6/6	-	39.5	24	310 N	3,100	No	BSL
7439-89-6	Iron	6,800	43,600	mg/kg	DSY-S-MW06-0406	6/6	-	43,600	39,173	5,500 N	NA	Yes	ASL
7439-92-1	Lead	2.49 J	81.4 J	mg/kg	DSY-SO-SB214-0203	7/7	-	81.4	12	400	150	No	BSL
7439-95-4	Magnesium	646	7,130	mg/kg	DSY-S-MW06-0406	6/6	-	7,130	3,811	NA	NA	No	NUT
7439-96-5	Manganese	305	1,190	mg/kg	DSY-SO-SB214-0203	6/6	-	1,190	1,037	180 N	390	Yes	ASL
7439-97-6	Mercury	0.0138 J	0.0603	mg/kg	DSY-SO-SB214-0203	3/6	0.0276 - 0.05	0.0603	0.012	2.3 N ⁽¹¹⁾	23	No	BSL
7440-02-0	Nickel	0.596	39.7	mg/kg	DSY-S-MW06-0406	6/6	-	39.7	28	150 N	1,000	No	BSL
7440-09-7	Potassium	166	681 J	mg/kg	DSY-SO-SB212-0204	6/6	-	681	1,699	NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.67	1.31	mg/kg	DSY-SO-SB214-0203	2/6	0.268 - 1.49	1.31	0.286	39 N	390	No	BSL
7440-23-5	Sodium	90.6 J	90.6 J	mg/kg	DSY-SO-SB214-0203	1/5	161 - 179	90.6	83	NA	NA	No	NUT
7440-62-2	Vanadium	3.97	20.6	mg/kg	DSY-SO-SB213-0203	6/6	-	20.6	23	39 N	550	No	BSL, BKG
7440-66-6	Zinc	27.1 J	335 J	mg/kg	DSY-SO-SB214-0203	6/6	-	335	66	2,300 N	6,000	No	BSL

TABLE 5-27
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
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Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.

2 - Values presented are sample-specific quantitation limits.

3 - The maximum detected concentration is used for screening purposes.

4 - Background concentration is upper prediction limit. See Appendix G.

5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).

6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.

7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

8 - Value is for acenaphthene.

9 - Value is for pyrene.

10 - Value is for hexavalent chromium.

11 - Value is for mercuric chloride (and other mercury salts).

Definitions:

C = Carcinogen

COPC = Chemical Of Potential Concern

J = Estimated value

N = Noncarcinogen

NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level and site background.

For elimination as a COPC:

BKG = Within Background Levels

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples
DSY-S-MW06-0406
DSY-SO-SB210-0102
DSY-SO-SB211-0102
DSY-SO-SB212-0204
DSY-SO-SB213-0203
DSY-SO-SB214-0203
B6-S6

TABLE 5-28
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	USEPA RSL Migration from Soil to Groundwater ⁽⁵⁾	RIDEM GA Leachability Criteria ⁽⁶⁾	Exceeds Screening Criteria?
Polycyclic Aromatic Hydrocarbons												
91-57-6	2-Methylnaphthalene	3.38 J	281	ug/kg	DSY-SO-SB214-0203	3/6	3.83 - 360	281	NA	140	NA	Yes
83-32-9	Acenaphthene	2.87 J	2.87 J	ug/kg	DSY-SO-SB213-0203	1/6	3.53 - 360	2.87	NA	4,100	NA	No
208-96-8	Acenaphthylene	3.5 J	47.2	ug/kg	DSY-SO-SB214-0203	4/6	3.9 - 360	47.2	NA	4,100 ⁽⁷⁾	NA	No
120-12-7	Anthracene	4.71 J	17.2	ug/kg	DSY-SO-SB212-0204	3/6	4.11 - 360	17.2	NA	42,000	NA	No
56-55-3	Benzo(a)anthracene	32.5	252	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	252	NA	10	NA	Yes
50-32-8	Benzo(a)pyrene	18.9	172	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	172	NA	3.5	240,000	Yes
205-99-2	Benzo(b)fluoranthene	26.6	336	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	336	NA	35	NA	Yes
191-24-2	Benzo(g,h,i)perylene	10.7 J	91.1	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	91.1	NA	9,500 ⁽⁸⁾	NA	No
207-08-9	Benzo(k)fluoranthene	11.3 J	124	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	124	NA	350	NA	No
218-01-9	Chrysene	20.5	356	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	356	NA	1,100	NA	No
53-70-3	Dibenzo(a,h)anthracene	7.48 J	43.7	ug/kg	DSY-SO-SB214-0203	3/6	3.83 - 360	43.7	NA	11	NA	Yes
206-44-0	Fluoranthene	39.6	451	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	451	NA	70,000	NA	No
86-73-7	Fluorene	2.22 J	8.85 J	ug/kg	DSY-SO-SB212-0204	3/6	4.11 - 360	8.85	NA	4,000	NA	No
193-39-5	Indeno(1,2,3-cd)pyrene	10.2 J	82.7	ug/kg	DSY-SO-SB214-0203	5/6	360 - 360	82.7	NA	120	NA	No
91-20-3	Naphthalene	2.5 J	175	ug/kg	DSY-SO-SB214-0203	4/6	3.9 - 360	175	NA	0.47	800	Yes
85-01-8	Phenanthrene	24.8	400	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	400	NA	9,500 ⁽⁸⁾	NA	No
129-00-0	Pyrene	33.9	375	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	375	NA	9,500	NA	No
Pesticides/PCBs												
1336-36-3	Total Aroclors	95	95	ug/kg	B6-S6	1/6	17.2 - 26.9	95	NA	26	10,000	Yes
Metals												
7429-90-5	Aluminum	2,180	19,900	mg/kg	DSY-S-MW06-0406	6/6	-	19,900	13,075	23,000	NA	No
7440-36-0	Antimony	1.15 J	1.15 J	mg/kg	DSY-SO-SB214-0203	1/6	0.428 - 17.6	1.15	ND	0.27	NA	Yes
7440-38-2	Arsenic	1.47 J	47.2 J	mg/kg	DSY-SO-SB214-0203	7/7	-	47.2	20	0.0013	NA	Yes
7440-39-3	Barium	5.5 J	57.7 J	mg/kg	DSY-SO-SB214-0203	6/6	-	57.7	36	120	NA	No
7440-41-7	Beryllium	0.507 J	0.759	mg/kg	DSY-SO-SB214-0203	5/6	0.34 - 0.34	0.759	0.64	13	NA	No
7440-43-9	Cadmium	0.0903 J	1.4	mg/kg	B6-S6	2/7	0.107 - 1	1.4	0.23	0.52	NA	Yes
7440-70-2	Calcium	279 J	2,040 J	mg/kg	DSY-SO-SB214-0203	6/6	-	2,040	1,689	NA	NA	No
7440-47-3	Chromium	0.788 J	25.6 J	mg/kg	DSY-S-MW06-0406	7/7	-	25.6	18	0.00059⁽⁹⁾	NA	Yes
7440-48-4	Cobalt	1.29 J	24	mg/kg	DSY-S-MW06-0406	6/6	-	24	17	0.21	NA	Yes
7440-50-8	Copper	1.67 J	39.5 J	mg/kg	DSY-SO-SB214-0203	6/6	-	39.5	24	22	NA	Yes
7439-89-6	Iron	6,800	43,600	mg/kg	DSY-S-MW06-0406	6/6	-	43,600	39,173	270	NA	Yes
7439-92-1	Lead	2.49 J	81.4 J	mg/kg	DSY-SO-SB214-0203	7/7	-	81.4	12	14⁽¹⁰⁾	NA	Yes
7439-95-4	Magnesium	646	7,130	mg/kg	DSY-S-MW06-0406	6/6	-	7,130	3,811	NA	NA	No
7439-96-5	Manganese	305	1,190	mg/kg	DSY-SO-SB214-0203	6/6	-	1,190	1,037	21	NA	Yes
7439-97-6	Mercury	0.0138 J	0.0603	mg/kg	DSY-SO-SB214-0203	3/6	0.0276 - 0.05	0.0603	0.012	0.033	NA	Yes
7440-02-0	Nickel	0.596	39.7	mg/kg	DSY-S-MW06-0406	6/6	-	39.7	28	20	NA	Yes
7440-09-7	Potassium	166	681 J	mg/kg	DSY-SO-SB212-0204	6/6	-	681	1,699	NA	NA	No
7782-49-2	Selenium	0.67	1.31	mg/kg	DSY-SO-SB214-0203	2/6	0.268 - 1.49	1.31	0.286	0.4	NA	Yes
7440-23-5	Sodium	90.6 J	90.6 J	mg/kg	DSY-SO-SB214-0203	1/5	161 - 179	90.6	83	NA	NA	No
7440-62-2	Vanadium	3.97	20.6	mg/kg	DSY-SO-SB213-0203	6/6	-	20.6	23	78	NA	No
7440-66-6	Zinc	27.1 J	335 J	mg/kg	DSY-SO-SB214-0203	6/6	-	335	66	290	NA	Yes

TABLE 5-28
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012.
- 6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 7 - Value is for acenaphthene.
- 8 - Value is for pyrene.
- 9 - Value is for hexavalent chromium.
- 10 - Value is MCL based soil screening level.

Definitions:

- J = Estimated value
- NA = Not Applicable/Not Available

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

Associated Samples

- DSY-S-MW06-0406
- DSY-SO-SB210-0102
- DSY-SO-SB211-0102
- DSY-SO-SB212-0204
- DSY-SO-SB213-0203
- DSY-SO-SB214-0203
- B6-S6

TABLE 5-29
CHEMICALS RETAINED AS COPCS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical	North Waterfront					Central Shipyard				Building 234				South Waterfront	PCB Removal Area	
	Surface Soil	Subsurface Soil	Groundwater		Soil Gas Vapor Intrusion	Surface Soil	Subsurface Soil	Groundwater		Surface Soil	Subsurface Soil	Groundwater		Subsurface Soil	Surface Soil	Subsurface Soil
			Direct Contact	Vapor Intrusion				Direct Contact	Vapor Intrusion			Direct Contact	Vapor Intrusion			
Volatile Organic Compounds																
1,3-Butadiene					E											
Acrylonitrile					E											
Benzene					E											
cis-1,2-Dichloroethene			E									E				
Trichloroethene			E,R	E	E							E	E			
Vinyl Chloride			E	E								E,R	E			
Semivolatile Organic Compounds																
Benzo(a)anthracene	E					E	E,R			E					E,R	E
Benzo(a)pyrene	E,R	E				E	E,R			E,R	E				E,R	E
Benzo(b)fluoranthene	E,R					E	E,R			E					E,R	E
Benzo(g,h,i)perylene															R	
Benzo(k)fluoranthene															E,R	
Chrysene	R					R	R			R					R	
Dibenzo(a,h)anthracene	E	E					E			E					E,R	E
Hexachloroethane																
Indeno(1,2,3-cd)pyrene	E						E			E					E,R	
Pesticides/PCBs																
Aroclor-1260															E	
Total Aroclors															E	
Inorganics																
Aluminum		E	E				E	E			E	E		E		E
Arsenic			E,R			E,R	E,R	E,R		E,R	E,R	E,R		E,R	E,R	E,R
Beryllium										R						
Cadmium								E		E						
Chromium	E	E	E			E	E	E		E	E	E		E		E
Cobalt	E	E				E	E	E		E	E	E		E	E	E
Iron	E	E	E			E	E	E		E	E	E		E	E	E
Lead										R						
Manganese			E			E,R		E		E,R	E,R	E			E,R	E,R

Notes
E - Chemical exceeded USEPA screening criteria and was retained as a COPC.
R - Chemical exceeded RIDEM screening criteria and was retained as a COPC.

TABLE 5-30
SELECTION OF EXPOSURE PATHWAYS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Surface Soil	Surface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Industrial workers may contact surface soil during normal work activities.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	Quant Quant	Trespassers may contact surface soil while at the site.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	Quant	Industrial workers may be exposed to fugitive dust and volatile emissions during work activities.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Trespassers	Adolescents	Inhalation	Quant	Trespassers may be exposed to fugitive dust and volatile emissions while at the site.
					Adult	Inhalation	Quant	
		Subsurface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	None None	Current industrial workers are not exposed to subsurface soil.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	None None	Current trespassers are not exposed to subsurface soil.
					Adult	Ingestion Dermal	None None	
			Derecktor Shipyard	Industrial Worker	Adult	Inhalation	None	Current industrial workers are not exposed to subsurface soil.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trespassers	Adolescents	Inhalation	None	Current trespassers are not exposed to subsurface soil.
					Adult	Inhalation	None	
	Groundwater	Groundwater	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	None None	Current industrial workers are not exposed to groundwater.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with ground water during excavation activities.
				Trespassers Users	Adolescents	Ingestion Dermal	None None	Current trespassers are not exposed to groundwater.
					Adult	Ingestion Dermal	None None	

TABLE 5-30
SELECTION OF EXPOSURE PATHWAYS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	None	Current industrial workers are not exposed to groundwater.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Trespassers	Adolescents	Inhalation	None	Current trespassers are not exposed to groundwater.
					Adult	Inhalation	None	
			Vapor Intrusion	Industrial Worker	Adult	Inhalation	None	At present there are no buildings on the site.
Future	Surface Soil	Surface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Industrial workers may contact surface soil during normal work activities.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	Quant Quant	Trespassers may contact surface soil while at the site.
					Adult	Ingestion Dermal	Quant Quant	
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
				Industrial Worker	Adult	Inhalation	Quant	Industrial workers may be exposed to fugitive dust and volatile emissions during work activities.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Trespassers	Adolescents	Inhalation	Quant	Trespassers may be exposed to fugitive dust and volatile emissions while at the site.
					Adult	Inhalation	Quant	
				Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
	Subsurface Soil	Subsurface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by industrial workers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.

TABLE 5-30
SELECTION OF EXPOSURE PATHWAYS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Subsurface Soil	Subsurface Soil	Derecktor Shipyard	Trespassers	Adolescents	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by trespassers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	Quant	Although exposures to subsurface soil by industrial workers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trespassers	Adolescents	Inhalation	Quant	Although exposures to subsurface soil by trespassers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
				Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
Future	Groundwater	Groundwater	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Future industrial workers may be exposed to groundwater if groundwater was used as a water supply.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Trespassers Users	Adolescents	Ingestion Dermal	None None	Future trespassers are not expected to be exposed to groundwater.
					Adult	Ingestion Dermal	None None	
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	None	Future industrial workers are not exposed to be exposed to COPCs that have volatilized from groundwater.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Trespassers	Adolescents	Inhalation	None	Future trespassers are not expected to be exposed to groundwater.
					Adult	Inhalation	None	

TABLE 5-30
SELECTION OF EXPOSURE PATHWAYS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Air	Derecktor Shipyard	Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
			Vapor Intrusion	Industrial Worker	Adult	Inhalation	Qual	Future industrial workers could be exposed to COPCs that have volatilized from groundwater and migrated through building foundations and into indoor air.
				Residents	Child	Inhalation	Qual	Hypothetical residents could be exposed to COPCs that have volatilized from groundwater and migrated through building foundations and into indoor air.
					Adult	Inhalation	Qual	

Notes:

Qual - Qualitative.

Quant - Quantitative.

TABLE 5-31
RECEPTORS AND EXPOSURE ROUTES FOR QUANTITATIVE EVALUATION
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Receptors	Exposure Routes
Industrial Worker (current/future land use)	<ul style="list-style-type: none"> • Soil incidental ingestion • Soil dermal contact • Inhalation of air/dust emissions • Direct ingestion of groundwater • Groundwater dermal contact
Construction Workers (current/future land use)	<ul style="list-style-type: none"> • Soil incidental ingestion • Soil dermal contact • Inhalation of air/dust emissions • Groundwater incidental ingestion (during excavation) • Groundwater dermal contact (during excavation) • Groundwater inhalation of volatile organics (during excavation)
Trespassers (Adolescent/Adults) (current/future land use)	<ul style="list-style-type: none"> • Soil incidental ingestion • Soil dermal contact • Inhalation of air/dust emissions
Hypothetical Residents (Children/Adult) (future land use)	<ul style="list-style-type: none"> • Soil incidental ingestion • Soil dermal contact • Inhalation of air/dust emissions • Direct ingestion of groundwater • Groundwater dermal contact (showering/bathing) • Inhalation of volatiles in groundwater (showering/bathing)

TABLE 5-32
EXPOSURE POINT CONCENTRATIONS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical	North Waterfront				Central Shipyard				Former Building 234				South Waterfront	PCB Removal Area		
	Surface Soil		Subsurface Soil (mg/kg)	Groundwater (ug/L)	Surface Soil		Subsurface Soil (mg/kg)	Groundwater (ug/L)	Surface Soil		Subsurface Soil (mg/kg)	Groundwater (ug/L)	Subsurface Soil (mg/kg)	Surface Soil		Subsurface Soil (mg/kg)
	Unpaved (mg/kg)	All (mg/kg)			Unpaved (mg/kg)	All (mg/kg)			Unpaved (mg/kg)	All (mg/kg)				Unpaved (mg/kg)	All (mg/kg)	
Volatile Organic Compounds																
cis-1,2-Dichloroethene	NA	NA	NA	4.26 ⁽¹⁾	NA	NA	NA	NA	NA	NA	NA	12.7 ⁽¹⁾	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	12.2 ⁽¹⁾	NA	NA	NA	NA	NA	NA	NA	3.9 ⁽¹⁾	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	1.47 ⁽¹⁾	NA	NA	NA	NA	NA	NA	NA	0.263 ⁽¹⁾	NA	NA	NA	NA
Semivolatile Organic Compounds																
Benzo(a)anthracene	0.232 ⁽¹⁾	0.207 ⁽²⁾	NA	NA	ND-Soil	0.30 ⁽²⁾	0.278 ⁽²⁾	NA	0.324 ⁽²⁾	0.3 ⁽²⁾	NA	NA	NA	0.13 ⁽¹⁾	5.74 ⁽¹⁾	0.146 ⁽³⁾
Benzo(a)pyrene	0.165 ⁽¹⁾	0.161 ⁽²⁾	0.044 ⁽¹⁾	NA	ND-Soil	0.14 ⁽¹⁾	0.194 ⁽²⁾	NA	0.288 ⁽²⁾	0.27 ⁽²⁾	0.055 ⁽¹⁾	NA	NA	0.12 ⁽¹⁾	4.92 ⁽¹⁾	0.167 ⁽⁴⁾
Benzo(b)fluoranthene	0.263 ⁽¹⁾	0.251 ⁽²⁾	NA	NA	ND-Soil	0.34 ⁽²⁾	0.247 ⁽²⁾	NA	0.477 ⁽²⁾	0.43 ⁽²⁾	NA	NA	NA	0.18 ⁽¹⁾	7.12 ⁽¹⁾	0.322 ⁽⁴⁾
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.072 ⁽¹⁾	2.07 ⁽¹⁾	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.086 ⁽¹⁾	2.48 ⁽¹⁾	NA
Chrysene	0.238 ⁽¹⁾	0.209 ⁽²⁾	NA	NA	ND-Soil	0.30 ⁽²⁾	0.282 ⁽²⁾	NA	0.409 ⁽²⁾	0.36 ⁽²⁾	NA	NA	NA	0.14 ⁽¹⁾	5.65 ⁽¹⁾	NA
Dibenzo(a,h)anthracene	0.124 ⁽¹⁾	0.124 ⁽¹⁾	0.0233 ⁽¹⁾	NA	NA	NA	0.046 ⁽¹⁾	NA	0.062 ⁽¹⁾	0.062 ⁽¹⁾	NA	NA	NA	0.017 ⁽¹⁾	0.82 ⁽¹⁾	0.044 ⁽³⁾
Indeno(1,2,3-cd)pyrene	0.099 ⁽¹⁾	0.109 ⁽²⁾	NA	NA	NA	NA	0.20 ⁽²⁾	NA	0.18 ⁽²⁾	0.18 ⁽²⁾	NA	NA	NA	0.071 ⁽¹⁾	2.07 ⁽¹⁾	NA
Pesticides/PCBs																
Total Aroclors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0244 ⁽¹⁾	0.416 ⁽¹⁾	NA
Inorganics																
Aluminum	NA	NA	7,510 ⁽⁶⁾	337 ⁽¹⁾	NA	NA	10,200 ⁽⁵⁾	312 ⁽¹⁾	NA	NA	12,600 ⁽⁵⁾	53.7 ⁽¹⁾	15,800 ⁽⁵⁾	NA	NA	16,100 ⁽⁵⁾
Arsenic	NA	NA	NA	ND-GW	24.4 ⁽¹⁾	23.7 ⁽⁵⁾	18.4 ⁽²⁾	78.1 ⁽¹⁾	17.9 ⁽⁵⁾	16.4 ⁽⁵⁾	23.3 ⁽⁴⁾	1.32 ⁽¹⁾	23.7 ⁽⁵⁾	21.7 ⁽¹⁾	21.8 ⁽¹⁾	35 ⁽⁶⁾
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	3.2 ⁽⁴⁾	3.5 ⁽¹⁾	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	1.53 ⁽¹⁾	13 ⁽¹⁾	13 ⁽¹⁾	NA	NA	NA	NA	NA	NA
Chromium	10.8 ⁽⁷⁾	13.5 ⁽⁴⁾	11 ⁽⁶⁾	0.508 ⁽¹⁾	15.8 ⁽¹⁾	17.3 ⁽⁵⁾	13.3 ⁽⁵⁾	ND-GW	83 ⁽⁶⁾	91.1 ⁽¹⁰⁾	25.4 ⁽⁶⁾	ND-GW	19.1 ⁽⁵⁾	NA	NA	19.1 ⁽⁵⁾
Cobalt	7.0 ⁽²⁾	7.9 ⁽²⁾	8.68 ⁽³⁾	NA	14.7 ⁽¹⁾	14.6 ⁽⁵⁾	12.3 ⁽⁵⁾	24.8 ⁽¹⁾	20 ⁽⁵⁾	17.8 ⁽⁵⁾	13.3 ⁽²⁾	1.74 ⁽¹⁾	23.8 ⁽⁵⁾	22.7 ⁽¹⁾	22.7 ⁽¹⁾	18.7 ⁽⁵⁾
Iron	18,800 ⁽⁵⁾	17,425 ⁽⁶⁾	20,100 ⁽⁶⁾	605 ⁽¹⁾	31,800 ⁽¹⁾	32,500 ⁽⁵⁾	26,900 ⁽⁵⁾	65,800 ⁽¹⁾	32,100 ⁽⁵⁾	30,020 ⁽⁵⁾	31,600 ⁽⁵⁾	459 ⁽¹⁾	32,100 ⁽⁵⁾	30,600 ⁽¹⁾	32,000 ⁽¹⁾	37,600 ⁽⁵⁾
Lead	NA	NA	NA	NA	NA	NA	NA	NA	53.9 ⁽⁸⁾	53.6 ⁽⁸⁾	NA	NA	NA	NA	NA	NA
Manganese	229 ⁽⁵⁾	NA	NA	53.9 ⁽¹⁾	448 ⁽¹⁾	435 ⁽⁵⁾	NA	9,100 ⁽¹⁾	509 ⁽⁵⁾	474 ⁽⁵⁾	684 ⁽⁶⁾	532 ⁽¹⁾	NA	619 ⁽¹⁾	619 ⁽¹⁾	872 ⁽⁶⁾

Notes:
Appendix F.1 lists the samples that were used to calculate the EPCs.
NA - Not applicable. Not a COPC for this media.
ND-GW - Not detected in 2011 groundwater samples.
ND-Soil - Not detected in soil samples collected in the unpaved area in the Central Shipyard.
1 - Maximum Detected Concentration
2 - 95% KM (t)
3 - 95% KM (BCA)
4 - 95% KM (Chebyshev)
5 - 95% Student's-t
6 - 95% Approximate Gamma
7 - 95% KM (Percentile Bootstrap)
8 - Average Concentration
9 - 95% Modified-t

TABLE 5-33
SUMMARY OF EXPOSURE INPUT PARAMETERS
REASONABLE MAXIMUM EXPOSURES
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Parameter Code	Exposure Parameter	Construction Worker	Industrial Worker	Adolescent Trespasser	Adult Trespasser	Child Resident	Adult Resident
All Exposures							
ED	Exposure Duration (years)	1 ⁽¹⁾	25 ^(2,3)	10 ⁽⁴⁾	20 ⁽⁴⁾	6 ^(2,3)	24 ^(2,3)
BW	Body Weight (kg)	70 ⁽²⁾	70 ^(2,3)	50 ⁽²⁾	70 ⁽²⁾	15 ^(2,3)	70 ^(2,3)
AT-N	Averaging Time (Non-Cancer) (days)	365 ⁽⁵⁾	9,125 ^(3,5)	4,380 ⁽⁵⁾	8,760 ⁽⁵⁾	2,190 ^(3,5)	8,760 ^(3,5)
AT-C	Averaging Time (Cancer) (days)	25,550 ⁽⁵⁾	25,550 ^(3,5)	25,550 ⁽⁵⁾	25,550 ⁽⁵⁾	25,550 ^(3,5)	25,550 ^(3,5)
Incidental Ingestion/Dermal Contact with Soil							
C _{soil}	Exposure concentration for soil (mg/kg)	Maximum or 95% UCL ⁽⁶⁾	Maximum or 95% UCL ⁽⁶⁾	Maximum or 95% UCL ⁽⁶⁾	Maximum or 95% UCL ⁽⁶⁾	Maximum or 95% UCL ⁽⁶⁾	Maximum or 95% UCL ⁽⁶⁾
IR	Ingestion Rate (mg/day)	330 ⁽²⁾	100 ⁽²⁾	100 ⁽²⁾	100 ⁽²⁾	200 ^(1,3)	100 ^(1,3)
EF	Exposure Frequency (days/year)	130 ⁽⁷⁾	250 ^(3,8)	48 ⁽⁹⁾	48 ⁽⁹⁾	350 ⁽¹⁾	350 ⁽¹⁾
FI	Fraction Ingested (unitless)	1	1	1	1	1	1
SA	Skin Surface Available for Contact (cm ²)	3,300 ⁽⁸⁾	3,300 ⁽⁸⁾	5,500 ⁽¹⁰⁾	5,700 ⁽⁸⁾	2,800 ⁽⁸⁾	5,700 ⁽⁸⁾
AF	Soil to Skin Adherence Factor (mg/cm ² /event)	0.3 ⁽⁸⁾	0.2 ⁽⁸⁾	0.4 ⁽⁸⁾	0.07 ⁽⁸⁾	0.2 ⁽⁸⁾	0.07 ⁽⁸⁾
ABS	Absorption Factor (unitless)	chemical-specific ⁽⁸⁾	chemical-specific ⁽⁸⁾	chemical-specific ⁽⁸⁾	chemical-specific ⁽⁸⁾	chemical-specific ⁽⁸⁾	chemical-specific ⁽⁸⁾
CF	Conversion Factor (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Inhalation Fugitive Dust/Volatile Emissions from Soil							
C _{air}	Exposure concentration for air (mg/m ³)	calculated ⁽¹⁾	calculated ⁽¹⁾	calculated ⁽¹⁾	calculated ⁽¹⁾	calculated ⁽¹⁾	calculated ⁽¹⁾
ET	Exposure Time (hours/day)	8 ⁽⁷⁾	8 ⁽¹¹⁾	4 ⁽⁹⁾	4 ⁽⁹⁾	24	24
EF	Exposure Frequency (days/year)	130 ⁽⁷⁾	250 ⁽⁸⁾	48 ⁽⁹⁾	48 ⁽⁹⁾	350 ^(1,3)	350 ^(1,3)
PEF	Particulate Emission Factor (m ³ /kg)	1.4E+06 ⁽¹⁾	1.1E+10 ⁽¹²⁾	1.1E+10 ⁽¹²⁾	1.1E+10 ⁽¹²⁾	1.1E+10 ⁽¹²⁾	1.1E+10 ⁽¹²⁾
Ingestion/Dermal Contact with Groundwater							
C _{gw}	Exposure concentration for groundwater (ug/L)	Maximum	Maximum	NA	NA	Maximum	Maximum
IR	Ingestion Rate (L/day)	0.05 ⁽¹³⁾	1 ⁽¹⁴⁾	NA	NA	1 ⁽²⁾	2 ⁽²⁾
EF	Exposure Frequency (days/year)	130 ⁽⁷⁾	250 ^(3,8)	NA	NA	350 ⁽¹⁾	350 ⁽¹⁾
ET	Exposure Time (hours/day)	8 ⁽⁷⁾	0.5 ⁽¹³⁾	NA	NA	1.0 ⁽⁸⁾	0.58 ⁽⁸⁾
EV	Event Frequency (events/day)	1 ⁽¹³⁾	1	NA	NA	1 ⁽¹³⁾	1 ⁽¹³⁾
SA	Skin Surface Available for Contact (cm ²)	3,300 ⁽⁸⁾	904 ⁽¹⁵⁾	NA	NA	6,600 ⁽⁸⁾	18,000 ⁽⁸⁾
	Kp (cm/hour), t* (hour/event), τ (hour), and B (unitless)	chemical-specific ⁽⁸⁾	chemical-specific ⁽⁸⁾	NA	NA	chemical-specific ⁽⁸⁾	chemical-specific ⁽⁸⁾
Inhalation of Volatile Emissions from Groundwater							
C _{air}	Exposure concentration for air (mg/m ³)	calculated ⁽¹⁶⁾	NA	NA	NA	NA	NA
ET	Exposure Time (hours/day)	8 ⁽⁷⁾	NA	NA	NA	NA	NA

TABLE 5-33
SUMMARY OF EXPOSURE INPUT PARAMETERS
REASONABLE MAXIMUM EXPOSURES
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

Parameter Code	Exposure Parameter	Construction Worker	Industrial Worker	Adolescent Trespasser	Adult Trespasser	Child Resident	Adult Resident
EF	Exposure Frequency (days/year)	130 ⁽⁷⁾	NA	NA	NA	NA	NA
VF	Volatilization Factor (L/m ³)	calculated ⁽¹⁶⁾	NA	NA	NA	0.5 ⁽¹⁴⁾	0.5 ⁽¹⁴⁾

Notes:

- 1 - USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9365.4-24.
- 2 - USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.
- 3 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.
- 4 - Adolescent ages 6 to 16 years old and an adult ages 16 to 36 years old for a total exposure duration of 30 years.
- 5 - USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.
- 6 - USEPA, 2002. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.
- 7 - Assumes a 26 week construction project over a course of one year.
- 8 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. PA/540/R/99/005.
- 9 - Assumes 4 hours a day, 2 days a week for 24 weeks (mid-April through mid-October).
- 10 - Assumes assumes that the head, forearms, hands, lower legs, and feet are exposed (USEPA, 1997).
- 11 - Length of a typical work day.
- 12 - USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.lsd.ornl.gov/calc_start.htm. Site-specific values for Hartford, Connecticut.
- 13 - Professional judgment.
- 14 - USEPA, 1991. Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part B, Development of Risk-Based Preliminary Remediation Goals.
- 15 - Represents hands of the industrial worker, USEPA, 2004.
- 16 - VDEQ September 2004. Virginia Department of Environmental Quality (VDEQ, online -<http://www.deq.state.va.us/brownfieldweb/vrp.html>).

TABLE 5-34
INTERMEDIATE VARIABLES FOR CALCULATING DA(EVENT)
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Volatile Organic Compounds												
cis-1,2-Dichloroethene	Groundwater	0	1	1.1E-02	cm/hr	(1)	hr	3.7E-01	hr	8.8E-01	hr	4.1E-02
Tetrachloroethene	Groundwater	0	1	3.3E-02	cm/hr	(1)	hr	9.1E-01	hr	2.2E+00	hr	1.7E-01
Total 1,2-Dichloroethene	Groundwater	0	1	7.7E-03	cm/hr	(1)	hr	3.7E-01	hr	8.9E-01	hr	2.9E-02
Trichloroethene	Groundwater	0	1	1.2E-02	cm/hr	(1)	hr	5.8E-01	hr	1.4E+00	hr	5.1E-02
Vinyl Chloride	Groundwater	0	1	5.6E-03	cm/hr	(1)	hr	2.4E-01	hr	5.7E-01	hr	1.7E-02
Semivolatile Organic Compounds												
Benzo(a)anthracene	Soil	0.13	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾
Benzo(a)pyrene	Soil	0.13	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾
Benzo(b)fluoranthene	Soil	0.13	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾
Benzo(g,h,i)perylene	Soil	0.13	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾
Benzo(k)fluoranthene	Soil	0.13	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾
Chrysene	Soil	0.13	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾
Dibenzo(a,h)anthracene	Soil	0.13	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾
Indeno(1,2,3-cd)pyrene	Soil	0.13	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾
PCBs												
Total Aroclors	Soil	0.14	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾	NA ⁽²⁾
Inorganics												
Aluminum	Soil, Groundwater	0	1	1.0E-03	cm/hr	NA	NA	NA	NA	NA	NA	NA
Arsenic	Soil, Groundwater	0.03	1	1.0E-03	cm/hr	NA	NA	NA	NA	NA	NA	NA
Beryllium	Soil	0	1	1.0E-03	cm/hr	NA	NA	NA	NA	NA	NA	NA
Cadmium	Soil	0.001	1	1.0E-03	cm/hr	NA	NA	NA	NA	NA	NA	NA
Chromium VI	Soil, Groundwater	0	1	2.0E-03	cm/hr	NA	NA	NA	NA	NA	NA	NA
Cobalt	Soil, Groundwater	0	1	4.0E-04	cm/hr	NA	NA	NA	NA	NA	NA	NA
Iron	Soil, Groundwater	0	1	1.0E-03	cm/hr	NA	NA	NA	NA	NA	NA	NA
Manganese	Soil, Groundwater	0	1	1.0E-03	cm/hr	NA	NA	NA	NA	NA	NA	NA

Notes:

All values from EPA's Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final, July 2004.

1 - T(event) is 8 hrs for the construction worker; 0.5 hr for industrial workers, 1 hr for RME for hypothetical child residents; and 0.58 hrs for hypothetical adult residents.

2 - RAGS Part E recommends not attempting to quantify risk because contaminants are outside the effective predictive domain of the model.

FA = Fraction Absorbed Water

Kp = Dermal Permeability Coefficient of Compound in Water

T(event) = Event Duration

Tau = Lag Time

T* = Time to Reach Steady-State

B = Dimensionless Ratio of the Permeability Coefficient of a Compound Through the Stratum Corneum Relative to its Permeability Coefficient Across the Viable Epidermis

NA = Not applicable.

TABLE 5-35
CHEMICAL PROPERTIES FOR
VOLATILIZATION FROM GROUNDWATER TO OUTDOOR AIR MODELS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical	Molecular Weight (g/mole)	Henry's Law Constant (atm-m³/mol)
cis-1,2-Dichloroethene	9.69E+01	4.08E-03
Tetrachloroethene	1.66E+02	1.77E-02
Trichloroethene	1.31E+02	9.85E-03
Vinyl Chloride	6.25E+01	2.78E-02

Source:

USEPA 2012: USEPA Regional Screening Levels for
Chemical Contaminants at Superfund Sites, May.

**TABLE 5-36
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2**

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal ⁽¹⁾	Absorbed RfD for Dermal ⁽²⁾		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds										
cis-1,2-Dichloroethene	Subchronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Kidney	300/1	PPRTV	2/3/2011
	Chronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	Kidney	3000/1	IRIS	9/21/2012
Tetrachloroethene	Subchronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Liver	100/1	HEAST	9/97
	Chronic	6.0E-03	mg/kg/day	1	6.0E-03	mg/kg/day	Neurotoxicity	1000/1	IRIS	9/21/2012
Trichloroethene	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Immune System, Developmental	10 - 1000	IRIS	9/21/2012
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Liver	30/1	IRIS	9/21/2012
Semivolatile Organic Compounds										
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene ⁽³⁾	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Kidney	3000/1	IRIS	9/21/2012
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs										
Total Aroclors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics										
Aluminum	Subchronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Central Nervous System	30/1	ATSDR	9/2008
	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Central Nervous System	100	PPRTV	10/23/2006
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, Cardiovascular System	3/1	IRIS	9/21/2012
Beryllium	Subchronic	5.0E-03	mg/kg/day	0.007	3.5E-05	mg/kg/day	Gastrointestinal System	100/1	HEAST	9/97
	Chronic	2.0E-03	mg/kg/day	0.007	1.4E-05	mg/kg/day	Gastrointestinal System	300/1	IRIS	9/21/2012
Cadmium	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Kidney	10/1	IRIS	9/21/2012
Chromium ⁽⁴⁾	Subchronic	2.0E-02	mg/kg/day	0.025	5.0E-04	mg/kg/day	None Reported	100/3	HEAST	9/97
	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	None Reported	300/3	IRIS	6/3/2011
Cobalt	Subchronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Thyroid	300/1	PPRTV	8/25/2008
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Thyroid	3000/1	PPRTV	8/25/2008
Iron	Subchronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese ⁽⁵⁾	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	Central Nervous System	1	IRIS	6/3/2011

TABLE 5-36
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Notes:

- 1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
- 2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
- 3 - Pyrene is used as a surrogate for benzo(g,h,i)perylene.
- 4 - Values are for hexavalent chromium.
- 5 - Adjusted IRIS value in accordance with IRIS.

Definitions:

- HEAST = Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Available.
ATSDR = Agency for Toxic Substances and Disease Registry.
PPRTV = Provisional Peer Reviewed Toxicity Value.

TABLE 5-37
NON-CANCER TOXICITY DATA – INHALATION
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD ⁽¹⁾		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds									
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	Chronic	4.0E-02	mg/m ³	1.1E-02	(mg/kg/day)	Neurotoxicity	1000/1	IRIS	9/21/2012
Trichloroethene	Subchronic	5.4E-01	mg/m ³	1.5E-01	(mg/kg/day)	Central Nervous System	300/1	ATSDR	9/1997
	Chronic	2.0E-03	mg/m ³	5.7E-04	(mg/kg/day)	Immune System, Developmental	10 - 100	IRIS	9/21/2012
Vinyl Chloride	Chronic	1.0E-01	mg/m ³	2.9E-02	(mg/kg/day)	Liver	30/1	IRIS	9/21/2012
Semivolatile Organic Compounds									
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs									
Total Aroclors	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics									
Aluminum	Chronic	5.0E-03	mg/m3	1.4E-03	(mg/kg/day)	Central Nervous System	300/1	PPRTV	10/23/2006
Arsenic	Chronic	1.5E-05	mg/m3	4.3E-06	(mg/kg/day)	Skin, Cardiovascular System	NA	Cal EPA(1)	9/2009
Beryllium	Chronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Respiratory	10/1	IRIS	9/21/2012
Cadmium	Chronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Kidney, Respiratory	NA	Cal EPA(2)	12/2008
Chromium ⁽²⁾	Chronic	1.0E-04	mg/m3	2.9E-05	(mg/kg/day)	Respiratory	300/1	IRIS	9/21/2012
Cobalt	Subchronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Respiratory	100/1	PPRTV	8/25/2008
	Chronic	6.0E-06	mg/m3	1.7E-06	(mg/kg/day)	Respiratory	300/1	PPRTV	8/25/2008
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	Chronic	5.0E-05	mg/m ³	1.4E-05	(mg/kg/day)	Central Nervous System	1000/1	IRIS	9/21/2012

TABLE 5-37
NON-CANCER TOXICITY DATA – INHALATION
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

Notes:

1 - Extrapolated RfD = RfC *20m³/day / 70 kg

2 - Values are for hexavalent chromium.

Definitions:

IRIS = Integrated Risk Information System

NA = Not Applicable

ATSDR = Agency for Toxic Substances and Disease Registry.

Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

Cal EPA(2) = Technical Support Document For the Derivation of Noncancer Reference Exposure Levels, December 2008.

HEAST = Health Effects Assessment Summary Tables

NYSDOH = Final Report, Trichloroethene Air Criteria Document, New York State Department of Health, October, 2006

PPRTV = Provisional Peer Reviewed Toxicity Value.

TABLE 5-38
CANCER TOXICITY DATA -- ORAL/DERMAL
FORMER ROBERT E. DEREKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal ⁽¹⁾	Absorbed Cancer Slope Factor for Dermal ⁽²⁾		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds								
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	9/21/2012
Tetrachloroethene	2.1E-03	(mg/kg/day) ⁻¹	1	2.1E-03	(mg/kg/day) ⁻¹	Likely to be carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - non-mutagen ^(3,4)	3.7E-02	(mg/kg/day) ⁻¹	1	3.7E-02	(mg/kg/day) ⁻¹	Carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - mutagen ^(3,4)	9.3E-03	(mg/kg/day) ⁻¹	1	9.3E-03	(mg/kg/day) ⁻¹	Carcinogenic to humans	IRIS	9/21/2012
Vinyl Chloride ⁽³⁾	7.2E-01	(mg/kg/day) ⁻¹	1	7.2E-01	(mg/kg/day) ⁻¹	A / Known human carcinogen	IRIS	9/21/2012
Semivolatile Organic Compounds								
Benzo(a)anthracene ⁽³⁾	7.3E-01	(mg/kg/day) ⁻¹	1	7.3E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Benzo(a)pyrene ⁽³⁾	7.3E+00	(mg/kg/day) ⁻¹	1	7.3E+00	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	9/21/2012
Benzo(b)fluoranthene ⁽³⁾	7.3E-01	(mg/kg/day) ⁻¹	1	7.3E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	9/21/2012
Benzo(k)fluoranthene ⁽³⁾	7.3E-02	(mg/kg/day) ⁻¹	1	7.3E-02	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Chrysene ⁽³⁾	7.3E-03	(mg/kg/day) ⁻¹	1	7.3E-03	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Dibenzo(a,h)anthracene ⁽³⁾	7.3E+00	(mg/kg/day) ⁻¹	1	7.3E+00	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Indeno(1,2,3-cd)pyrene ⁽³⁾	7.3E-01	(mg/kg/day) ⁻¹	1	7.3E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Pesticides/PCBs								
Total Aroclors	2.0E+00	(mg/kg/day) ⁻¹	1	2.0E+00	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	9/21/2012
Inorganics								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	(mg/kg/day) ⁻¹	1	1.5E+00	(mg/kg/day) ⁻¹	A / Known human carcinogen	IRIS	9/21/2012
Beryllium	NA	NA	NA	NA	NA	Carcinogenic potential cannot be determined	IRIS	9/21/2012
Cadmium	NA	NA	NA	NA	NA	B1 / Probable human carcinogen	IRIS	9/21/2012
Chromium ^(3,5)	5.0E-01	(mg/kg/day) ⁻¹	0.025	2.0E+01	(mg/kg/day) ⁻¹	D (Not classifiable as to human carcinogenicity)	NJDEP	4/8/2009
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	9/21/2012
Manganese	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	9/21/2012

TABLE 5-38
CANCER TOXICITY DATA -- ORAL/DERMAL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

Notes:

1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.

2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral absorption efficiency for dermal.

3 - Trichloroethene, vinyl chloride, carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

4 - See text for a discussion of trichloroethene toxicity.

5 - Values are for hexavalent chromium.

IRIS = Integrated Risk Information System.

NA = Not Available.

Cal EPA = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

NJDEP = New Jersey Department of Environmental Protection.

USEPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

TABLE 5-39
CANCER TOXICITY DATA -- INHALATION
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor ⁽¹⁾		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds							
cis-1,2-Dichloroethene	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	9/21/2012
Tetrachloroethene	2.6E-07	(ug/m ³) ⁻¹	9.1E-04	(mg/kg/day) ⁻¹	Likely to be carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - non-mutagen ^(2,3)	3.1E-06	(ug/m ³) ⁻¹	1.1E-02	(mg/kg/day) ⁻¹	Carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - mutagen ^(2,3)	1.0E-06	(ug/m ³) ⁻¹	3.5E-03	(mg/kg/day) ⁻¹	Carcinogenic to humans	IRIS	9/21/2012
Vinyl Chloride	4.4E-06	(ug/m ³) ⁻¹	1.5E-02	(mg/kg/day) ⁻¹	A / Known human carcinogen	IRIS	9/21/2012
Semivolatile Organic Compounds							
Benzo(a)anthracene ⁽²⁾	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Benzo(a)pyrene ⁽²⁾	1.1E-03	(ug/m ³) ⁻¹	3.9E+00	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Benzo(b)fluoranthene ⁽²⁾	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Benzo(g,h,i)perylene	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	9/21/2012
Benzo(k)fluoranthene ⁽²⁾	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Chrysene ⁽²⁾	1.1E-05	(ug/m ³) ⁻¹	3.9E-02	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Dibenzo(a,h)anthracene ⁽²⁾	1.2E-03	(ug/m ³) ⁻¹	4.2E+00	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Indeno(1,2,3-cd)pyrene ⁽²⁾	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Pesticides/PCBs							
Total Aroclors	1.0E-04	(ug/m3) ⁻¹	3.5E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	9/21/2012
Inorganics							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	(ug/m ³) ⁻¹	1.5E+01	(mg/kg/day) ⁻¹	A / Known human carcinogen	IRIS	9/21/2012
Beryllium	2.4E-03	(ug/m ³) ⁻¹	8.4E+00	(mg/kg/day) ⁻¹	B1 /Known/likely human carcinogen	IRIS	9/21/2012
Cadmium	1.8E-03	(ug/m ³) ⁻¹	6.3E+00	(mg/kg/day) ⁻¹	B1 /Known/likely human carcinogen	IRIS	9/21/2012
Chromium ^(2,4)	8.4E-02	(ug/m ³) ⁻¹	2.9E+02	(mg/kg/day) ⁻¹	A / Known human carcinogen	IRIS	9/21/2012
Cobalt	9.0E-03	(ug/m ³) ⁻¹	3.2E+01	(mg/kg/day) ⁻¹	NA	PPRTV	8/25/2008
Iron	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	9/21/2012
Manganese	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	9/21/2012

TABLE 5-39
CANCER TOXICITY DATA -- INHALATION
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

Notes:

1 - Inhalation CSF = Unit Risk * 70 kg / 20m³/day.

2 - Trichloroethene, vinyl chloride, carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

3 - See text for a discussion of trichloroethene toxicity.

4 - Values are for hexavalent chromium.

Definitions:

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System.

NA = Not Available.

Cal EPA = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

PPRTV = Provisional Peer Reviewed Toxicity Value.

TABLE 5-40
SUMMARY OF CANCER RISKS AND HAZARD INDICES
NORTH WATERFRONT
FORMER DERECKTOR SHIPYARD, NEWPORT, RHODE ISLAND
PAGE 1 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Current Adolescent Trespassers	Surface Soil	Incidental Ingestion	9E-07	--	--	--	0.02	--
		Dermal Contact	8E-07	--	--	--	--	--
		Inhalation	8E-10	--	--	--	0.00001	--
		Total	2E-06	--	--	--	0.02	--
Current Adult Trespassers	Surface Soil	Incidental Ingestion	4E-07	--	--	--	0.01	--
		Dermal Contact	7E-08	--	--	--	--	--
		Inhalation	6E-10	--	--	--	0.00001	--
		Total	5E-07	--	--	--	0.01	--
Current Lifelong Trespassers	Surface Soil	Incidental Ingestion	1E-06	--	--	--	NA	--
		Dermal Contact	9E-07	--	--	--	NA	--
		Inhalation	1E-09	--	--	--	NA	--
		Total	2E-06	--	--	--	NA	--
Current Industrial Workers	Surface Soil	Incidental Ingestion	3E-06	--	--	Chromium VI	0.06	--
		Dermal Contact	8E-07	--	--	--	--	--
		Inhalation	7E-09	--	--	--	0.0001	--
		Total	4E-06	--	--	Chromium VI	0.06	--
Future Adolescent Trespassers	Surface Soil	Incidental Ingestion	1E-06	--	--	--	0.01	--
		Dermal Contact	8E-07	--	--	--	--	--
		Inhalation	1E-09	--	--	--	0.000003	--
		Total	2E-06	--	--	--	0.01	--
	Subsurface Soil	Incidental Ingestion	7E-07	--	--	--	0.02	--
		Dermal Contact	2E-07	--	--	--	--	--
		Inhalation	8E-10	--	--	--	0.000006	--
		Total	9E-07	--	--	--	0.02	--
Future Adult Trespassers	Surface Soil	Incidental Ingestion	5E-07	--	--	--	0.01	--
		Dermal Contact	7E-08	--	--	--	--	--
		Inhalation	7E-10	--	--	--	0.000003	--
		Total	6E-07	--	--	--	0.01	--
	Subsurface Soil	Incidental Ingestion	3E-07	--	--	--	0.01	--
		Dermal Contact	1E-08	--	--	--	--	--
		Inhalation	6E-10	--	--	--	0.000006	--
		Total	3E-07	--	--	--	0.01	--
Future Lifelong Trespassers	Surface Soil	Incidental Ingestion	2E-06	--	--	--	NA	--
		Dermal Contact	9E-07	--	--	--	NA	--
		Inhalation	2E-09	--	--	--	NA	--
		Total	3E-06	--	--	--	NA	--
	Subsurface Soil	Incidental Ingestion	1E-06	--	--	--	NA	--
		Dermal Contact	2E-07	--	--	--	NA	--
		Inhalation	1E-09	--	--	--	NA	--
		Total	1E-06	--	--	--	NA	--

TABLE 5-40
SUMMARY OF CANCER RISKS AND HAZARD INDICES
NORTH WATERFRONT
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Current/Future Construction Workers	Surface Soil	Incidental Ingestion	2E-07	--	--	--	0.05	--
		Dermal Contact	2E-08	--	--	--	--	--
		Inhalation	1E-06	--	--	--	0.04	--
		Total	1E-06	--	--	Chromium VI	0.09	--
	Subsurface Soil	Incidental Ingestion	1E-07	--	--	--	0.07	--
		Dermal Contact	5E-09	--	--	--	--	--
		Inhalation	1E-06	--	--	--	0.2	--
		Total	1E-06	--	--	--	0.2	--
	Groundwater	Incidental Ingestion	7E-09	--	--	--	0.008	--
		Dermal Contact	6E-08	--	--	--	0.05	--
		Inhalation	3E-09	--	--	--	0.0002	--
		Total	7E-08	--	--	--	0.06	--
	Total surface soil and groundwater		1E-06				0.2	
	Total subsurface soil and groundwater		1E-06				0.3	
Future Industrial Workers	Surface Soil	Incidental Ingestion	3E-06	--	--	Chromium VI	0.05	--
		Dermal Contact	7E-07	--	--	--	--	--
		Inhalation	9E-09	--	--	--	0.00003	--
		Total	4E-06	--	--	Chromium VI	0.05	--
	Subsurface Soil	Incidental Ingestion	2E-06	--	--	Chromium VI	0.07	--
		Dermal Contact	1E-07	--	--	--	--	--
		Inhalation	7E-09	--	--	--	0.00006	--
		Total	2E-06	--	--	Chromium VI	0.07	--
	Groundwater	Incidental Ingestion	7E-06	--	--	Vinyl Chloride	0.3	--
		Dermal Contact	8E-08	--	--	--	0.004	--
		Total	7E-06	--	--	Vinyl Chloride	0.3	--
	Total surface soil and groundwater		1E-05				0.4	
	Total subsurface soil and groundwater		9E-06				0.4	
Hypothetical Child Residents	Surface Soil	Incidental Ingestion	5E-05	--	Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	0.7	--
		Dermal Contact	5E-06	--	--	Benzo(a)pyrene, Dibenzo(a,h)anthracene	--	--
		Inhalation	5E-08	--	--	--	0.0001	--
		Total	6E-05	--	Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	0.7	--
	Subsurface Soil	Incidental Ingestion	4E-05	--	Chromium VI	Benzo(a)pyrene	0.9	--
		Dermal Contact	1E-06	--	--	--	--	--
		Inhalation	4E-08	--	--	--	0.0003	--
		Total	4E-05	--	Chromium VI	Benzo(a)pyrene	0.9	--
	Groundwater	Incidental Ingestion	9E-05	--	Vinyl Chloride	Trichloroethene, Chromium VI	2	Trichloroethene
		Dermal Contact	9E-06	--	--	Vinyl Chloride, Chromium VI	0.3	--
		Inhalation	8E-06	--	--	Trichloroethene, Vinyl Chloride	3	Trichloroethene
		Total	1E-04	--	Vinyl Chloride	Trichloroethene, Chromium VI	5	Trichloroethene
	Total surface soil and groundwater		2E-04				6	
	Total subsurface soil and groundwater		1E-04				6	

TABLE 5-40
SUMMARY OF CANCER RISKS AND HAZARD INDICES
NORTH WATERFRONT
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Hypothetical Adult Residents	Surface Soil	Incidental Ingestion	8E-06	--	--	Chromium VI	0.08	--
		Dermal Contact	1E-06	--	--	--	--	--
		Inhalation	6E-08	--	--	--	0.0001	--
		Total	9E-06	--	--	Benzo(a)pyrene, Chromium VI	0.08	--
	Subsurface Soil	Incidental Ingestion	5E-06	--	--	Chromium VI	0.09	--
		Dermal Contact	2E-07	--	--	--	--	--
		Inhalation	5E-08	--	--	--	0.0003	--
		Total	5E-06	--	--	Chromium VI	0.09	--
	Groundwater	Incidental Ingestion	2E-05	--	--	Trichloroethene, Vinyl Chloride, Chromium VI	0.8	--
		Dermal Contact	3E-06	--	--	Chromium VI	0.1	--
		Inhalation	1E-05	--	--	Trichloroethene	3	Trichloroethene
		Total	3E-05	--	--	Trichloroethene, Vinyl Chloride, Chromium VI	4	Trichloroethene
	Total surface soil and groundwater		4E-05				4	
	Total subsurface soil and groundwater		4E-05				4	
Hypothetical Lifelong Residents	Surface Soil	Incidental Ingestion	6E-05	--	Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	NA	--
		Dermal Contact	6E-06	--	--	Benzo(a)pyrene, Dibenzo(a,h)anthracene	NA	--
		Inhalation	1E-07	--	--	--	NA	--
		Total	7E-05	--	Chromium VI	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	--
	Subsurface Soil	Incidental Ingestion	4E-05	--	Chromium VI	Benzo(a)pyrene	NA	--
		Dermal Contact	1E-06	--	--	--	NA	--
		Inhalation	9E-08	--	--	--	NA	--
		Total	4E-05	--	Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	NA	--
	Groundwater	Incidental Ingestion	1E-04	--	Vinyl Chloride	Trichloroethene, Chromium VI	NA	--
		Dermal Contact	1E-05	--	--	Vinyl Chloride, Chromium VI	NA	--
		Inhalation	2E-05	--	--	Trichloroethene, Vinyl Chloride	NA	--
		Total	1E-04	--	Trichloroethene, Vinyl Chloride, Chromium VI	--	NA	--
	Total surface soil and groundwater		2E-04				NA	
	Total subsurface soil and groundwater		1E-04				NA	

TABLE 5-41
SUMMARY OF CANCER RISKS AND HAZARD INDICES
CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Current Adolescent Trespassers	Surface Soil	Incidental Ingestion	2E-06	--	--	--	0.05	--
		Dermal Contact	9E-07	--	--	--	0.01	--
		Inhalation	1E-09	--	--	--	0.00003	--
		Total	3E-06	--	--	Arsenic	0.07	--
Current Adult Trespassers	Surface Soil	Incidental Ingestion	2E-06	--	--	Arsenic	0.04	--
		Dermal Contact	2E-07	--	--	--	0.002	--
		Inhalation	9E-10	--	--	--	0.00003	--
		Total	3E-06	--	--	Arsenic	0.04	--
Current Lifelong Trespassers	Surface Soil	Incidental Ingestion	5E-06	--	--	Arsenic	NA	--
		Dermal Contact	1E-06	--	--	--	NA	--
		Inhalation	2E-09	--	--	--	NA	--
		Total	6E-06	--	--	Arsenic	NA	--
Current Industrial Workers	Surface Soil	Incidental Ingestion	2E-05	--	--	Arsenic, Chromium VI	0.2	--
		Dermal Contact	3E-06	--	--	Arsenic	0.02	--
		Inhalation	1E-08	--	--	--	0.0003	--
		Total	2E-05	--	Arsenic	Chromium VI	0.2	--
Future Adolescent Trespassers	Surface Soil	Incidental Ingestion	2E-06	--	--	--	0.05	--
		Dermal Contact	1E-06	--	--	--	0.01	--
		Inhalation	1E-09	--	--	--	0.00003	--
		Total	4E-06	--	--	Arsenic	0.07	--
	Subsurface Soil	Incidental Ingestion	2E-06	--	--	--	0.04	--
		Dermal Contact	1E-06	--	--	--	0.01	--
		Inhalation	1E-09	--	--	--	0.00001	--
		Total	3E-06	--	--	Arsenic	0.05	--
Future Adult Trespassers	Surface Soil	Incidental Ingestion	2E-06	--	--	Arsenic	0.04	--
		Dermal Contact	3E-07	--	--	--	0.002	--
		Inhalation	1E-09	--	--	--	0.00003	--
		Total	3E-06	--	--	Arsenic	0.04	--
	Subsurface Soil	Incidental Ingestion	2E-06	--	--	--	0.03	--
		Dermal Contact	2E-07	--	--	--	0.001	--
		Inhalation	7E-10	--	--	--	0.00001	--
		Total	2E-06	--	--	Arsenic	0.03	--
Future Lifelong Trespassers	Surface Soil	Incidental Ingestion	5E-06	--	--	Arsenic	NA	--
		Dermal Contact	2E-06	--	--	--	NA	--
		Inhalation	2E-09	--	--	--	NA	--
		Total	7E-06	--	--	Arsenic	NA	--
	Subsurface Soil	Incidental Ingestion	4E-06	--	--	Arsenic	NA	--
		Dermal Contact	2E-06	--	--	--	NA	--
		Inhalation	2E-09	--	--	--	NA	--
		Total	6E-06	--	--	Arsenic	NA	--

TABLE 5-41
SUMMARY OF CANCER RISKS AND HAZARD INDICES
CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Current/Future Construction Workers	Surface Soil	Incidental Ingestion	1E-06	--	--	--	0.3	--
		Dermal Contact	9E-08	--	--	--	0.01	--
		Inhalation	2E-06	--	--	Chromium VI	0.9	--
		Total	3E-06	--	--	Chromium VI	1	--
	Subsurface Soil	Incidental Ingestion	9E-07	--	--	--	0.2	--
		Dermal Contact	8E-08	--	--	--	0.009	--
		Inhalation	2E-06	--	--	--	0.3	--
		Total	3E-06	--	--	Chromium VI	0.5	--
	Groundwater	Incidental Ingestion	4E-07	--	--	--	0.2	--
		Dermal Contact	2E-07	--	--	--	1	--
		Total	7E-07	--	--	--	2	Target Organs HI < 1
	Total surface soil and groundwater		4E-06				3	
	Total subsurface soil and groundwater		4E-06				2	
Future Industrial Workers	Surface Soil	Incidental Ingestion	2E-05	--	--	Arsenic, Chromium VI	0.1	--
		Dermal Contact	3E-06	--	--	Arsenic	0.02	--
		Inhalation	1E-08	--	--	--	0.0002	--
		Total	2E-05	--	--	Arsenic, Chromium VI	0.2	--
	Subsurface Soil	Incidental Ingestion	1E-05	--	--	Arsenic, Chromium VI	0.1	--
		Dermal Contact	3E-06	--	--	Arsenic	0.01	--
		Inhalation	1E-08	--	--	--	0.00008	--
		Total	2E-05	--	--	Arsenic, Chromium VI	0.1	--
	Groundwater	Incidental Ingestion	4E-04	Arsenic	--	--	7	Arsenic, Manganese
		Dermal Contact	2E-07	--	--	--	0.04	--
		Total	4E-04	Arsenic	--	--	7	Arsenic, Manganese
	Total surface soil and groundwater		4E-04				7	
	Total subsurface soil and groundwater		4E-04				7	
Hypothetical Child Residents	Surface Soil	Incidental Ingestion	1E-04	--	Arsenic, Chromium VI	Benzo(a)pyrene	3	Target Organs HI < 1
		Dermal Contact	6E-06	--	--	Benzo(a)pyrene, Arsenic	0.08	--
		Inhalation	6E-08	--	--	--	0.001	--
		Total	1E-04	--	Arsenic, Chromium VI	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene	3	Target Organs HI < 1
	Subsurface Soil	Incidental Ingestion	8E-05	--	Arsenic, Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	2	Target Organs HI < 1
		Dermal Contact	7E-06	--	--	Benzo(a)pyrene, Arsenic	0.07	--
		Inhalation	5E-08	--	--	--	0.0005	--
		Total	9E-05	--	Arsenic, Chromium VI	Benzo(a)anthracene, Benzo(a)pyrene, Dibenzo(a,h)anthracene	2	Target Organs HI < 1
	Groundwater	Incidental Ingestion	6E-04	Arsenic	--	--	52	Manganese, Arsenic, Iron, Cobalt
		Dermal Contact	4E-06	--	--	Arsenic	4	Manganese
		Total	6E-04	Arsenic	--	--	56	Manganese, Arsenic, Iron, Cobalt
	Total surface soil and groundwater		7E-04				59	
	Total subsurface soil and groundwater		7E-04				58	

TABLE 5-41
SUMMARY OF CANCER RISKS AND HAZARD INDICES
CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Hypothetical Adult Residents	Surface Soil	Incidental Ingestion	3E-05	--	Arsenic	Chromium VI	0.3	--
		Dermal Contact	3E-06	--	--	Arsenic	0.01	--
		Inhalation	9E-08	--	--	--	0.001	--
		Total	3E-05	--	Arsenic	Chromium VI	0.3	--
	Subsurface Soil	Incidental Ingestion	2E-05	--	--	Arsenic, Chromium VI	0.2	--
		Dermal Contact	3E-06	--	--	Arsenic	0.01	--
		Inhalation	7E-08	--	--	--	0.0005	--
		Total	2E-05	--	--	Benzo(a)pyrene, Arsenic, Chromium VI	0.2	--
	Groundwater	Incidental Ingestion	1E-03	Arsenic	--	--	22	Manganese, Arsenic, Iron, Cobalt
		Dermal Contact	6E-06	--	--	Arsenic	1	--
		Total	1E-03	Arsenic	--	--	24	Manganese, Arsenic, Iron, Cobalt
	Total surface soil and groundwater		1E-03				24	
	Total subsurface soil and groundwater		1E-03				24	
Hypothetical Lifelong Residents	Surface Soil	Incidental Ingestion	1E-04	--	Arsenic, Chromium VI	Benzo(a)pyrene, Benzo(b)fluoranthene	NA	--
		Dermal Contact	9E-06	--	--	Benzo(a)pyrene, Arsenic	NA	--
		Inhalation	1E-07	--	--	--	NA	--
		Total	1E-04	--	Arsenic, Chromium VI	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene	NA	--
	Subsurface Soil	Incidental Ingestion	1E-04	--	Arsenic, Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	NA	--
		Dermal Contact	1E-05	--	--	Benzo(a)pyrene, Arsenic	NA	--
		Inhalation	1E-07	--	--	--	NA	--
		Total	1E-04	--	Arsenic, Chromium VI	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	--
	Groundwater	Incidental Ingestion	2E-03	Arsenic	--	--	NA	--
		Dermal Contact	1E-05	--	--	Arsenic	NA	--
		Total	2E-03	Arsenic	--	--	NA	--
	Total surface soil and groundwater		2E-03				NA	
	Total subsurface soil and groundwater		2E-03				NA	

TABLE 5-42
SUMMARY OF CANCER RISKS AND HAZARD INDICES
FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Current Adolescent Trespassers	Surface Soil	Incidental Ingestion	6E-06	--	--	Chromium VI	0.07	--
		Dermal Contact	2E-06	--	--	--	0.01	--
		Inhalation	6E-09	--	--	--	0.00003	--
		Total	8E-06	--	--	Arsenic, Chromium VI	0.08	--
Current Adult Trespassers	Surface Soil	Incidental Ingestion	4E-06	--	--	Chromium VI	0.05	--
		Dermal Contact	3E-07	--	--	--	0.002	--
		Inhalation	4E-09	--	--	--	0.00003	--
		Total	4E-06	--	--	Arsenic, Chromium VI	0.05	--
Current Lifelong Trespassers	Surface Soil	Incidental Ingestion	1E-05	--	--	Arsenic, Chromium VI	NA	--
		Dermal Contact	2E-06	--	--	--	NA	--
		Inhalation	1E-08	--	--	--	NA	--
		Total	1E-05	--	--	Arsenic, Chromium VI	NA	--
Current Industrial Workers	Surface Soil	Incidental Ingestion	3E-05	--	--	Arsenic, Chromium VI	0.2	--
		Dermal Contact	3E-06	--	--	Arsenic	0.01	--
		Inhalation	5E-08	--	--	--	0.0003	--
		Total	3E-05	--	--	Arsenic, Chromium VI	0.2	--
Future Adolescent Trespassers	Surface Soil	Incidental Ingestion	6E-06	--	--	Chromium VI	0.06	--
		Dermal Contact	2E-06	--	--	--	0.01	--
		Inhalation	7E-09	--	--	--	0.00003	--
		Total	8E-06	--	--	Arsenic, Chromium VI	0.07	--
	Subsurface Soil	Incidental Ingestion	3E-06	--	--	--	0.06	--
		Dermal Contact	1E-06	--	--	--	0.01	--
		Inhalation	2E-09	--	--	--	0.00004	--
		Total	4E-06	--	--	Arsenic	0.07	--
Future Adult Trespassers	Surface Soil	Incidental Ingestion	4E-06	--	--	Chromium VI	0.04	--
		Dermal Contact	2E-07	--	--	--	0.002	--
		Inhalation	5E-09	--	--	--	0.00003	--
		Total	4E-06	--	--	Chromium VI	0.05	--
	Subsurface Soil	Incidental Ingestion	3E-06	--	--	Arsenic	0.04	--
		Dermal Contact	2E-07	--	--	--	0.002	--
		Inhalation	1E-09	--	--	--	0.00004	--
		Total	3E-06	--	--	Arsenic	0.04	--
Future Lifelong Trespassers	Surface Soil	Incidental Ingestion	1E-05	--	--	Arsenic, Chromium VI	NA	--
		Dermal Contact	2E-06	--	--	--	NA	--
		Inhalation	1E-08	--	--	--	NA	--
		Total	1E-05	--	--	Arsenic, Chromium VI	NA	--
	Subsurface Soil	Incidental Ingestion	5E-06	--	--	Arsenic, Chromium VI	NA	--
		Dermal Contact	1E-06	--	--	--	NA	--
		Inhalation	3E-09	--	--	--	NA	--
		Total	7E-06	--	--	Arsenic, Chromium VI	NA	--

TABLE 5-42
SUMMARY OF CANCER RISKS AND HAZARD INDICES
FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Current/Future Construction Workers	Surface Soil	Incidental Ingestion	2E-06	--	--	--	0.3	--
		Dermal Contact	8E-08	--	--	--	0.01	--
		Inhalation	1E-05	--	--	Chromium VI	1	--
		Total	1E-05	--	--	Chromium VI	1	--
	Subsurface Soil	Incidental Ingestion	1E-06	--	--	--	0.3	--
		Dermal Contact	8E-08	--	--	--	0.01	--
		Inhalation	3E-06	--	--	Chromium VI	2	Target Organs HI < 1
		Total	4E-06	--	--	Chromium VI	2	Target Organs HI < 1
	Groundwater	Incidental Ingestion	9E-09	--	--	--	0.009	--
		Dermal Contact	1E-08	--	--	--	0.09	--
		Inhalation	1E-09	--	--	--	0.00005	--
		Total	2E-08	--	--	--	0.1	--
	Total surface soil and groundwater		1E-05				1	
	Total subsurface soil and groundwater		4E-06				2	
Future Industrial Workers	Surface Soil	Incidental Ingestion	3E-05	--	Chromium VI	Arsenic	0.2	--
		Dermal Contact	3E-06	--	--	Arsenic	0.01	--
		Inhalation	6E-08	--	--	--	0.0003	--
		Total	3E-05	--	Chromium VI	Arsenic	0.2	--
	Subsurface Soil	Incidental Ingestion	2E-05	--	--	Arsenic, Chromium VI	0.2	--
		Dermal Contact	3E-06	--	--	Arsenic	0.02	--
		Inhalation	2E-08	--	--	--	0.0004	--
		Total	2E-05	--	--	Arsenic, Chromium VI	0.2	--
	Groundwater	Incidental Ingestion	8E-06	--	--	Arsenic	0.5	--
		Dermal Contact	2E-08	--	--	--	0.004	--
		Total	8E-06	--	--	Arsenic	0.5	--
	Total surface soil and groundwater		4E-05				0.7	
	Total subsurface soil and groundwater		3E-05				0.7	
Hypothetical Child Residents	Surface Soil	Incidental Ingestion	3E-04	Chromium VI	Arsenic	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	3	Target Organs HI < 1
		Dermal Contact	9E-06	--	--	Benzo(a)pyrene, Arsenic	0.08	--
		Inhalation	3E-07	--	--	--	0.001	--
		Total	3E-04	Chromium VI	Benzo(a)pyrene, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	3	Target Organs HI < 1
	Subsurface Soil	Incidental Ingestion	1E-04	--	Arsenic, Chromium VI	Benzo(a)pyrene	3	Target Organs HI < 1
		Dermal Contact	4E-06	--	--	Arsenic	0.08	--
		Inhalation	9E-08	--	--	--	0.002	--
		Total	1E-04	--	Arsenic, Chromium VI	Benzo(a)pyrene	3	Target Organs HI < 1
	Groundwater	Incidental Ingestion	3E-05	--	--	Vinyl Chloride, Arsenic	3	Target Organs HI < 1
		Dermal Contact	1E-06	--	--	--	0.4	--
		Inhalation	2E-06	--	--	--	0.9	--
		Total	3E-05	--	Vinyl Chloride	Trichloroethene, Arsenic	4	Manganese
	Total surface soil and groundwater		3E-04				7	
	Total subsurface soil and groundwater		1E-04				7	

TABLE 5-42
SUMMARY OF CANCER RISKS AND HAZARD INDICES
FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Hypothetical Adult Residents	Surface Soil	Incidental Ingestion	5E-05	--	Chromium VI	Benzo(a)pyrene, Arsenic	0.3	--
		Dermal Contact	3E-06	--	--	--	0.01	--
		Inhalation	4E-07	--	--	--	0.001	--
		Total	6E-05	--	Chromium VI	Benzo(a)pyrene, Arsenic	0.3	--
	Subsurface Soil	Incidental Ingestion	3E-05	--	Arsenic	Chromium VI	0.3	--
		Dermal Contact	2E-06	--	--	Arsenic	0.01	--
		Inhalation	1E-07	--	--	--	0.002	--
		Total	3E-05	--	Arsenic	Chromium VI	0.3	--
	Groundwater	Incidental Ingestion	2E-05	--	Arsenic	Vinyl Chloride	1	--
		Dermal Contact	5E-07	--	--	--	0.1	--
		Inhalation	3E-06	--	--	Trichloroethene	0.9	--
		Total	3E-05	--	Arsenic	Trichloroethene, Vinyl Chloride	2	Target Organ HI < 1
	Total surface soil and groundwater		9E-05				2	
	Total subsurface soil and groundwater		6E-05				2	
Hypothetical Lifelong Residents	Surface Soil	Incidental Ingestion	4E-04	Chromium VI	Arsenic	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	--
		Dermal Contact	1E-05	--	--	Benzo(a)pyrene, Arsenic	NA	--
		Inhalation	7E-07	--	--	--	NA	--
		Total	4E-04	Chromium VI	Benzo(a)pyrene, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	--
	Subsurface Soil	Incidental Ingestion	1E-04	--	Arsenic, Chromium VI	Benzo(a)pyrene	NA	--
		Dermal Contact	6E-06	--	--	Arsenic	NA	--
		Inhalation	2E-07	--	--	--	NA	--
		Total	1E-04	--	Arsenic, Chromium VI	Benzo(a)pyrene	NA	--
	Groundwater	Incidental Ingestion	5E-05	--	Vinyl Chloride, Arsenic	Trichloroethene	NA	--
		Dermal Contact	2E-06	--	--	--	NA	--
		Inhalation	5E-06	--	--	Trichloroethene	NA	--
		Total	6E-05	--	Vinyl Chloride, Arsenic	Trichloroethene	NA	--
	Total surface soil and groundwater		5E-04				NA	
	Total subsurface soil and groundwater		2E-04				NA	

TABLE 5-43
SUMMARY OF CANCER RISKS AND HAZARD INDICES
SOUTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Future Adolescent Trespassers	Subsurface Soil	Incidental Ingestion	2E-06	--	--	--	0.06	--
		Dermal Contact	9E-07	--	--	--	0.01	--
		Inhalation	1E-09	--	--	--	0.00002	--
		Total	3E-06	--	--	Arsenic	0.08	--
Future Adult Trespassers	Subsurface Soil	Incidental Ingestion	2E-06	--	--	Arsenic	0.05	--
		Dermal Contact	2E-07	--	--	--	0.002	--
		Inhalation	1E-09	--	--	--	0.00002	--
		Total	3E-06	--	--	Arsenic	0.05	--
Future Lifelong Trespassers	Subsurface Soil	Incidental Ingestion	5E-06	--	--	Arsenic, Chromium VI	NA	--
		Dermal Contact	1E-06	--	--	--	NA	--
		Inhalation	3E-09	--	--	--	NA	--
		Total	6E-06	--	--	Arsenic, Chromium VI	NA	--
Current/Future Construction Workers	Subsurface Soil	Incidental Ingestion	1E-06	--	--	--	0.3	--
		Dermal Contact	8E-08	--	--	--	0.01	--
		Inhalation	2E-06	--	--	Chromium VI	0.5	--
		Total	3E-06	--	--	Chromium VI	0.8	--
Future Industrial Workers	Subsurface Soil	Incidental Ingestion	2E-05	--	--	Arsenic, Chromium VI	0.2	--
		Dermal Contact	2E-06	--	--	Arsenic	0.02	--
		Inhalation	1E-08	--	--	--	0.0002	--
		Total	2E-05	--	--	Arsenic, Chromium VI	0.3	--
Future Child Residents	Subsurface Soil	Incidental Ingestion	9E-05	--	Arsenic, Chromium VI	--	3	Target Organs HI < 1
		Dermal Contact	3E-06	--	--	Arsenic	0.08	--
		Inhalation	7E-08	--	--	--	0.0008	--
		Total	1E-04	--	Arsenic, Chromium VI	--	3	Target Organs HI < 1
Future Adult Residents	Subsurface Soil	Incidental Ingestion	2E-05	--	Arsenic	Chromium VI	0.3	--
		Dermal Contact	2E-06	--	--	Arsenic	0.01	--
		Inhalation	1E-07	--	--	--	0.0008	--
		Total	3E-05	--	Arsenic	Chromium VI	0.3	--
Future Lifelong Residents	Subsurface Soil	Incidental Ingestion	1E-04	--	Arsenic, Chromium VI	--	NA	--
		Dermal Contact	5E-06	--	--	Arsenic	NA	--
		Inhalation	2E-07	--	--	--	NA	--
		Total	1E-04	--	Arsenic, Chromium VI	--	NA	--

TABLE 5-44
SUMMARY OF CANCER RISKS AND HAZARD INDICES
PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Current Adolescent Trespassers	Surface Soil	Incidental Ingestion	1E-06	--	--	--	0.06	--
		Dermal Contact	1E-06	--	--	--	0.01	--
		Inhalation	8E-11	--	--	--	0.00004	--
		Total	3E-06	--	--	Arsenic	0.07	--
Current Adult Trespassers	Surface Soil	Incidental Ingestion	2E-06	--	--	Arsenic	0.04	--
		Dermal Contact	2E-07	--	--	--	0.002	--
		Inhalation	2E-10	--	--	--	0.00004	--
		Total	2E-06	--	--	Arsenic	0.04	--
Current Lifelong Trespassers	Surface Soil	Incidental Ingestion	3E-06	--	--	Arsenic	NA	--
		Dermal Contact	1E-06	--	--	--	NA	--
		Inhalation	3E-10	--	--	--	NA	--
		Total	5E-06	--	--	Arsenic	NA	--
Current Industrial Workers	Surface Soil	Incidental Ingestion	1E-05	--	--	Arsenic	0.2	--
		Dermal Contact	3E-06	--	--	Arsenic	0.01	--
		Inhalation	2E-09	--	--	--	0.0004	--
		Total	1E-05	--	--	Arsenic	0.2	--
Future Adolescent Trespassers	Surface Soil	Incidental Ingestion	7E-06	--	--	Benzo(a)pyrene	0.06	--
		Dermal Contact	2E-05	--	--	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	0.01	--
		Inhalation	9E-11	--	--	--	0.00004	--
		Total	3E-05	--	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	0.07	--
	Subsurface Soil	Incidental Ingestion	3E-06	--	--	Arsenic	0.08	--
		Dermal Contact	2E-06	--	--	--	0.02	--
		Inhalation	1E-09	--	--	--	0.00005	--
		Total	5E-06	--	--	Arsenic	0.1	--
Future Adult Trespassers	Surface Soil	Incidental Ingestion	5E-06	--	--	Benzo(a)pyrene, Arsenic	0.04	--
		Dermal Contact	2E-06	--	--	--	0.002	--
		Inhalation	2E-10	--	--	--	0.00004	--
		Total	6E-06	--	--	Benzo(a)pyrene, Arsenic	0.04	--
	Subsurface Soil	Incidental Ingestion	3E-06	--	--	Arsenic	0.05	--
		Dermal Contact	4E-07	--	--	--	0.003	--
		Inhalation	1E-09	--	--	--	0.00005	--
		Total	4E-06	--	--	Arsenic	0.06	--
Future Lifelong Trespassers	Surface Soil	Incidental Ingestion	1E-05	--	--	Benzo(a)pyrene, Arsenic	NA	--
		Dermal Contact	2E-05	--	--	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	--
		Inhalation	3E-10	--	--	--	NA	--
		Total	3E-05	--	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	NA	--
	Subsurface Soil	Incidental Ingestion	7E-06	--	--	Arsenic, Chromium VI	NA	--
		Dermal Contact	2E-06	--	--	Arsenic	NA	--
		Inhalation	3E-09	--	--	--	NA	--
		Total	9E-06	--	--	Arsenic, Chromium VI	NA	--

TABLE 5-44
SUMMARY OF CANCER RISKS AND HAZARD INDICES
PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Current/Future Construction Workers	Surface Soil	Incidental Ingestion	2E-06	--	--	--	0.2	--
		Dermal Contact	5E-07	--	--	--	0.01	--
		Inhalation	3E-07	--	--	--	1	--
		Total	2E-06	--	--	--	1	--
	Subsurface Soil	Incidental Ingestion	1E-06	--	--	--	0.4	--
		Dermal Contact	1E-07	--	--	--	0.02	--
		Inhalation	2E-06	--	--	Chromium VI	2	Target Organs HI < 1
		Total	3E-06	--	--	Chromium VI	2	Target Organs HI < 1
Future Industrial Workers	Surface Soil	Incidental Ingestion	3E-05	--	--	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	0.2	--
		Dermal Contact	2E-05	--	--	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	0.01	--
		Inhalation	2E-09	--	--	--	0.0004	--
		Total	5E-05	--	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	0.2	--
	Subsurface Soil	Incidental Ingestion	2E-05	--	Arsenic	Chromium VI	0.3	--
		Dermal Contact	4E-06	--	--	Arsenic	0.02	--
		Inhalation	1E-08	--	--	--	0.0005	--
		Total	3E-05	--	Arsenic	Chromium VI	0.3	--
Hypothetical Child Residents	Surface Soil	Incidental Ingestion	3E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	Indeno(1,2,3-cd)pyrene	3	Target Organs HI < 1
		Dermal Contact	1E-04	--	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Arsenic	0.08	--
		Inhalation	3E-09	--	--	--	0.002	--
		Total	5E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	Indeno(1,2,3-cd)pyrene	3	Target Organs HI < 1
	Subsurface Soil	Incidental Ingestion	1E-04	--	Arsenic, Chromium VI	Benzo(a)pyrene, Dibenzo(a,h)anthracene	4	Target Organs HI < 1
		Dermal Contact	9E-06	--	--	Benzo(a)pyrene, Arsenic	0.1	--
		Inhalation	7E-08	--	--	--	0.002	--
		Total	1E-04	--	Arsenic, Chromium VI	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	4	Arsenic

TABLE 5-44
SUMMARY OF CANCER RISKS AND HAZARD INDICES
PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 3 OF 3

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁵ and ≤ 10 ⁻⁴	Chemicals with Cancer Risks > 10 ⁻⁶ and ≤ 10 ⁻⁵	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Hypothetical Adult Residents	Surface Soil	Incidental Ingestion	6E-05	--	Benzo(a)pyrene, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	0.3	--
		Dermal Contact	3E-05	--	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	0.01	--
		Inhalation	9E-09	--	--	--	0.002	--
		Total	9E-05	--	Benzo(a)pyrene, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene	0.3	--
	Subsurface Soil	Incidental Ingestion	3E-05	--	Arsenic	Chromium VI	0.4	--
		Dermal Contact	4E-06	--	--	Arsenic	0.02	--
		Inhalation	1E-07	--	--	--	0.002	--
		Total	4E-05	--	Arsenic	Benzo(a)pyrene, Chromium VI	0.4	--
Hypothetical Lifelong Residents	Surface Soil	Incidental Ingestion	4E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	Indeno(1,2,3-cd)pyrene	NA	--
		Dermal Contact	1E-04	--	Benzo(a)pyrene, Dibenzo(a,h)anthracene	Benzo(a)anthracene, Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, Arsenic	NA	--
		Inhalation	1E-08	--	--	--	NA	--
		Total	5E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Arsenic	Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene, Total Aroclors	NA	--
	Subsurface Soil	Incidental Ingestion	2E-04	--	Arsenic, Chromium VI	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	--
		Dermal Contact	1E-05	--	--	Benzo(a)pyrene, Arsenic	NA	--
		Inhalation	2E-07	--	--	--	NA	--
		Total	2E-04	--	Arsenic, Chromium VI	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene	NA	--

TABLE 5-45
SCREENING RISK EVALUATION FOR VAPOR INTRUSION
VISL CALCULATOR - NORTH WATERFRONT GROUNDWATER
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

COPC	Maximum Groundwater Concentration (ug/L)	Calculated Indoor Air Concentration (ug/m ³)	Residential		Industrial	
			Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
cis-1,2-Dichloroethene	4.26	0.57	No IUR	No RfC	No IUR	No RfC
trans-1,2-Dichloroethene	4.81	0.65	No IUR	1.0E-02	No IUR	2.50E-03
Tetrachloroethene	0.696	0.38	4.1E-08	9.2E-03	8.1E-09	2.20E-03
Trichloroethene	33	10.4	2.4E-05	5.0E+00	3.5E-06	1.2
Vinyl Chloride	1.47	1.45	9.0E-06	1.4E-02	5.2E-07	3.30E-03
		TOTAL	3.E-05	5	4.E-06	1

Bolded cell indicates that COPC was identified as a COPC in groundwater for vapor intrusion (Table 5-9).

COPC - Contaminant of Potential Concern

IUR - Inhalation Unit Risk

RfC - Reference Concentration

TABLE 5-46
SCREENING RISK EVALUATION FOR VAPOR INTRUSION
VISL CALCULATOR - NORTH WATERFRONT SOIL GAS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

COPC	Maximum Soil Gas Concentration (ug/m ³)	Calculated Indoor Air Concentration (ug/m ³)	Residential		Industrial	
			Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
Acrylonitrile*	2.8	0.28	7.8E-06	1.3E-01	1.6E-06	3.2E-02
Benzene*	6.8	0.68	2.1E-07	2.1E-03	4.3E-08	5.1E-04
1,3-Butadiene*	13	1.3	1.6E-05	6.2E-01	3.2E-06	1.5E-01
1,1-Dichloroethane*	0.25	0.025	1.6E-08	No RfC	3.3E-09	No RfC
cis-1,2-Dichloroethene	27	2.7	No IUR	No RfC	No IUR	No RfC
trans-1,2-Dichloroethene	4.1	0.41	No IUR	6.6E-03	No IUR	1.6E-03
Tetrachloroethene	12	1.2	1.3E-07	2.9E-02	2.5E-08	6.8E-03
1,1,1-Trichloroethane*	0.26	0.026	No IUR	5.0E-06	No IUR	1.2E-06
Trichloroethene	120	12	2.8E-05	5.8E+00	4.0E-06	1.4E+00
Vinyl Chloride	0.76	0.076	4.7E-07	7.3E-04	2.7E-08	1.7E-04
TOTAL			5.E-05	7	9.E-06	2
TOTAL OF CHLORINATED HYDROCARBONS			3.E-05	6	4.E-06	1

Bolded cell indicates that COPC was identified as a COPC in groundwater for vapor intrusion (Table 5-10).

*COPC was not detected in groundwater samples collected from North Waterfront.

COPC - Contaminant of Potential Concern

IUR - Inhalation Unit Risk

RfC - Reference Concentration

TABLE 5-47
SCREENING RISK EVALUATION FOR VAPOR INTRUSION
VISL CALCULATOR - FORMER BUILDING 234 GROUNDWATER
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

COPC	Maximum Groundwater Concentration (ug/L)	Calculated Indoor Air Concentration (ug/m ³)	Residential		Industrial	
			Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
1,1-Dichloroethene	0.25	0.22	No IUR	1.1E-03	No IUR	2.50E-04
cis-1,2-Dichloroethene	12.7	1.70	No IUR	No RfC	No IUR	No RfC
Trichloroethene	4	1.26	2.9E-06	6.1E-01	4.2E-07	1.4E-01
Vinyl Chloride	100	98.7	6.1E-04	9.5E-01	3.5E-05	2.3E-01
		TOTAL	6.E-04	2	4.E-05	0.4

Bolded cell indicates that COPC was identified as a COPC in groundwater for vapor intrusion (Table 5-22).

COPC - Contaminant of Potential Concern

IUR - Inhalation Unit Risk

RfC - Reference Concentration

TABLE 5-48
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
CURRENT ADOLESCENT TRESPASSERS		
Surface Soil		
Site Risk ⁽¹⁾	2E-06	0.02
Background Risk ⁽²⁾	6E-07	0.01
Site + Background Risk ⁽³⁾	3E-06	0.03
CURRENT ADULT TRESPASSERS		
Surface Soil		
Site Risk	5E-07	0.01
Background Risk	6E-07	0.007
Site + Background Risk	1E-06	0.02
CURRENT LIFELONG TRESPASSERS		
Surface Soil		
Site Risk	2E-06	NA
Background Risk	1E-06	NA
Site + Background Risk	3E-06	NA
CURRENT INDUSTRIAL WORKERS		
Surface Soil		
Site Risk	4E-06	0.06
Background Risk	4E-06	0.04
Site + Background Risk	8E-06	0.1
FUTURE ADOLESCENT TRESPASSERS		
Surface Soil		
Site Risk	2E-06	0.01
Background Risk	5E-07	0.01
Site + Background Risk	3E-06	0.02
Subsurface Soil		
Site Risk	8E-07	0.02
Background Risk	7E-07	0.01
Site + Background Risk	2E-06	0.03
FUTURE ADULT TRESPASSERS		
Surface Soil		
Site Risk	6E-07	0.01
Background Risk	5E-07	0.007
Site + Background Risk	1E-06	0.02
Subsurface Soil		
Site Risk	3E-07	0.01
Background Risk	6E-07	0.007
Site + Background Risk	9E-07	0.02

TABLE 5-48
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
FUTURE LIFELONG TRESPASSERS		
Surface Soil		
Site Risk	2E-06	NA
Background Risk	1E-06	NA
Site + Background Risk	3E-06	NA
Subsurface Soil		
Site Risk	1E-06	NA
Background Risk	1E-06	NA
Site + Background Risk	2E-06	NA
CURRENT/FUTURE CONSTRUCTION WORKERS		
Surface Soil		
Site Risk	2E-06	0.09
Background Risk	3E-07	0.6
Site + Background Risk	2E-06	0.7
Subsurface Soil		
Site Risk	1E-06	0.2
Background Risk	3E-07	0.5
Site + Background Risk	1E-06	0.7
Groundwater		
Site Risk	7E-08	0.06
Background Risk	0E+00	0
Site + Background Risk	7E-08	0.06
Site Totals		
Total Surface Soil and Groundwater	2E-06	0.2
Total Subsurface Soil and Groundwater	1E-06	0.3
Site and Background Totals		
Total Surface Soil and Groundwater	2E-06	0.8
Total Subsurface Soil and Groundwater	1E-06	0.8

TABLE 5-48
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 3 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
FUTURE INDUSTRIAL WORKERS		
Surface Soil		
Site Risk	4E-06	0.05
Background Risk	4E-06	0.04
Site + Background Risk	8E-06	0.09
Subsurface Soil		
Site Risk	2E-06	0.07
Background Risk	4E-06	0.04
Site + Background Risk	6E-06	0.1
Groundwater		
Site Risk	3E-06	0.2
Background Risk	0E+00	0
Site + Background Risk	3E-06	0.2
Site Totals		
Total Surface Soil and Groundwater	7E-06	0.3
Total Subsurface Soil and Groundwater	5E-06	0.3
Site and Background Totals		
Total Surface Soil and Groundwater	1E-05	0.3
Total Subsurface Soil and Groundwater	9E-06	0.3
CHILD RESIDENTS		
Surface Soil		
Site Risk	6E-05	0.7
Background Risk	1E-05	0.5
Site + Background Risk	7E-05	1
Subsurface Soil		
Site Risk	4E-05	0.9
Background Risk	1E-05	0.5
Site + Background Risk	5E-05	1
Groundwater		
Site Risk	1E-04	5
Background Risk	0E+00	0
Site + Background Risk	1E-04	5
Site Totals		
Total Surface Soil and Groundwater	2E-04	6
Total Subsurface Soil and Groundwater	1E-04	6

TABLE 5-48
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 4 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
Site and Background Totals		
Total Surface Soil and Groundwater	2E-04	6
Total Subsurface Soil and Groundwater	2E-04	6
ADULT RESIDENTS		
Surface Soil		
Site Risk	9E-06	0.08
Background Risk	5E-06	0.05
Site + Background Risk	1E-05	0.1
Subsurface Soil		
Site Risk	5E-06	0.09
Background Risk	6E-06	0.05
Site + Background Risk	1E-05	0.1
Groundwater		
Site Risk	3E-05	4
Background Risk	0E+00	0
Site + Background Risk	3E-05	4
Site Totals		
Total Surface Soil and Groundwater	4E-05	4
Total Subsurface Soil and Groundwater	4E-05	4
Site and Background Totals		
Total Surface Soil and Groundwater	4E-05	4
Total Subsurface Soil and Groundwater	4E-05	4
LIFELONG RESIDENTS		
Surface Soil		
Site Risk	7E-05	NA
Background Risk	1E-05	NA
Site + Background Risk	8E-05	NA
Subsurface Soil		
Site Risk	4E-05	NA
Background Risk	2E-05	NA
Site + Background Risk	6E-05	NA
Groundwater		
Site Risk	1E-04	NA
Background Risk	0E+00	NA
Site + Background Risk	1E-04	NA

TABLE 5-48
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 5 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
Site Totals		
Total Surface Soil and Groundwater	2E-04	NA
Total Subsurface Soil and Groundwater	1E-04	NA
Site and Background Totals		
Total Surface Soil and Groundwater	2E-04	NA
Total Subsurface Soil and Groundwater	2E-04	NA

Notes:

ILCR = Incremental Lifetime Cancer Risk

HI = Hazard Index

- 1 - Cancer risk or hazard index from only site-related chemicals detected at concentrations exceeding screening levels.
- 2 - Cancer risk or hazard index from only chemicals present at naturally occurring levels detected at concentrations exceeding screening levels. Aluminum, arsenic, and manganese were within background levels in surface soil. Arsenic and manganese were within background levels in subsurface soil.
- 3 - Cancer risk or hazard index from all chemicals detected at concentrations exceeding screening levels.

TABLE 5-49
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
CURRENT ADOLESCENT TRESPASSERS		
Surface Soil		
Site Risk ⁽¹⁾	3E-06	0.07
Background Risk ⁽²⁾	0E+00	0.003
Site + Background Risk ⁽³⁾	3E-06	0.07
CURRENT ADULT TRESPASSERS		
Surface Soil		
Site Risk	3E-06	0.04
Background Risk	0E+00	0.002
Site + Background Risk	3E-06	0.04
CURRENT LIFELONG TRESPASSERS		
Surface Soil		
Site Risk	6E-06	NA
Background Risk	0E+00	NA
Site + Background Risk	6E-06	NA
CURRENT INDUSTRIAL WORKERS		
Surface Soil		
Site Risk	2E-05	0.2
Background Risk	0E+00	0.01
Site + Background Risk	2E-05	0.2
FUTURE ADOLESCENT TRESPASSERS		
Surface Soil		
Site Risk	4E-06	0.07
Background Risk	0E+00	0.003
Site + Background Risk	4E-06	0.07
Subsurface Soil		
Site Risk	3E-06	0.05
Background Risk	0E+00	0.004
Site + Background Risk	3E-06	0.05
FUTURE ADULT TRESPASSERS		
Surface Soil		
Site Risk	3E-06	0.04
Background Risk	0E+00	0.002
Site + Background Risk	3E-06	0.04
Subsurface Soil		
Site Risk	2E-06	0.03
Background Risk	0E+00	0.003
Site + Background Risk	2E-06	0.03

TABLE 5-49
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
FUTURE LIFELONG TRESPASSERS		
Surface Soil		
Site Risk	7E-06	NA
Background Risk	0E+00	NA
Site + Background Risk	7E-06	NA
Subsurface Soil		
Site Risk	6E-06	NA
Background Risk	0E+00	NA
Site + Background Risk	6E-06	NA
CURRENT/FUTURE CONSTRUCTION WORKERS		
Surface Soil		
Site Risk	3E-06	1
Background Risk	0E+00	0.2
Site + Background Risk	3E-06	1
Subsurface Soil		
Site Risk	3E-06	0.5
Background Risk	0E+00	0.7
Site + Background Risk	3E-06	1
Groundwater		
Site Risk	7E-07	2 ⁽⁴⁾
Background Risk	0E+00	0
Site + Background Risk	7E-07	2 ⁽⁴⁾
Site Totals		
Total Surface Soil and Groundwater	4E-06	3
Total Subsurface Soil and Groundwater	4E-06	3
Site and Background Totals		
Total Surface Soil and Groundwater	4E-06	3
Total Subsurface Soil and Groundwater	4E-06	3

TABLE 5-49
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 3 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
FUTURE INDUSTRIAL WORKERS		
Surface Soil		
Site Risk	2E-05	0.2
Background Risk	0E+00	0.01
Site + Background Risk	2E-05	0.2
Subsurface Soil		
Site Risk	2E-05	0.1
Background Risk	0E+00	0.02
Site + Background Risk	2E-05	0.1
Groundwater		
Site Risk	2E-04	4
Background Risk	0E+00	0
Site + Background Risk	2E-04	4
Site Totals		
Total Surface Soil and Groundwater	2E-04	4
Total Subsurface Soil and Groundwater	2E-04	4
Site and Background Totals		
Total Surface Soil and Groundwater	2E-04	4
Total Subsurface Soil and Groundwater	2E-04	4
CHILD RESIDENTS		
Surface Soil		
Site Risk	1E-04	3 ⁽⁴⁾
Background Risk	0E+00	0.2
Site + Background Risk	1E-04	3 ⁽⁴⁾
Subsurface Soil		
Site Risk	9E-05	2 ⁽⁴⁾
Background Risk	0E+00	0.2
Site + Background Risk	9E-05	2 ⁽⁴⁾
Groundwater		
Site Risk	6E-04	56
Background Risk	0E+00	0
Site + Background Risk	6E-04	56
Site Totals		
Total Surface Soil and Groundwater	7E-04	59
Total Subsurface Soil and Groundwater	7E-04	58
Site and Background Totals		
Total Surface Soil and Groundwater	7E-04	59
Total Subsurface Soil and Groundwater	7E-04	58

TABLE 5-49
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 4 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
ADULT RESIDENTS		
Surface Soil		
Site Risk	3E-05	0.3
Background Risk	0E+00	0.02
Site + Background Risk	3E-05	0.3
Subsurface Soil		
Site Risk	2E-05	0.2
Background Risk	0E+00	0.02
Site + Background Risk	2E-05	0.2
Groundwater		
Site Risk	1E-03	24
Background Risk	0E+00	0
Site + Background Risk	1E-03	24
Site Totals		
Total Surface Soil and Groundwater	1E-03	24
Total Subsurface Soil and Groundwater	1E-03	24
Site and Background Totals		
Total Surface Soil and Groundwater	1E-03	24
Total Subsurface Soil and Groundwater	1E-03	24
LIFELONG RESIDENTS		
Surface Soil		
Site Risk	1E-04	NA
Background Risk	0E+00	NA
Site + Background Risk	1E-04	NA
Subsurface Soil		
Site Risk	1E-04	NA
Background Risk	0E+00	NA
Site + Background Risk	1E-04	NA
Groundwater		
Site Risk	2E-03	NA
Background Risk	0E+00	NA
Site + Background Risk	2E-03	NA
Site Totals		
Total Surface Soil and Groundwater	2E-03	NA
Total Subsurface Soil and Groundwater	2E-03	NA

TABLE 5-49
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 5 OF 5

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
Site and Background Totals		
Total Surface Soil and Groundwater	2E-03	NA
Total Subsurface Soil and Groundwater	2E-03	NA

Notes:

ILCR = Incremental Lifetime Cancer Risk

HI = Hazard Index

- 1 - Cancer risk or hazard index from only site-related chemicals detected at concentrations exceeding screening levels.
- 2 - Cancer risk or hazard index from only chemicals present at naturally occurring levels detected at concentrations exceeding screening levels. Aluminum was within background levels in surface soil. Manganese was within background levels in groundwater.
- 3 - Cancer risk or hazard index from all chemicals detected at concentrations exceeding screening levels.
- 4 - Hazard index for individual target organs were less than or equal to 1.

TABLE 5-50
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 4

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
CURRENT ADOLESCENT TRESPASSERS		
Surface Soil		
Site Risk ⁽¹⁾	8E-06	0.08
Background Risk ⁽²⁾	0E+00	0.003
Site + Background Risk ⁽³⁾	8E-06	0.08
CURRENT ADULT TRESPASSERS		
Surface Soil		
Site Risk	4E-06	0.05
Background Risk	0E+00	0.002
Site + Background Risk	4E-06	0.05
CURRENT LIFELONG TRESPASSERS		
Surface Soil		
Site Risk	1E-05	NA
Background Risk	0E+00	NA
Site + Background Risk	1E-05	NA
CURRENT INDUSTRIAL WORKERS		
Surface Soil		
Site Risk	3E-05	0.2
Background Risk	0E+00	0.01
Site + Background Risk	3E-05	0.2
FUTURE ADOLESCENT TRESPASSERS		
Surface Soil		
Site Risk	8E-06	0.07
Background Risk	0E+00	0.003
Site + Background Risk	8E-06	0.07
FUTURE ADULT TRESPASSERS		
Surface Soil		
Site Risk	4E-06	0.05
Background Risk	0E+00	0.002
Site + Background Risk	4E-06	0.05
FUTURE LIFELONG TRESPASSERS		
Surface Soil		
Site Risk	1E-05	NA
Background Risk	0E+00	NA
Site + Background Risk	1E-05	NA

TABLE 5-50
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 4

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
CURRENT/FUTURE CONSTRUCTION WORKERS		
Surface Soil		
Site Risk	1E-05	1
Background Risk	0E+00	0.2
Site + Background Risk	1E-05	1
Groundwater		
Site Risk	2E-08	0.1
Background Risk	0E+00	0
Site + Background Risk	2E-08	0.1
Site Totals		
Total Surface Soil and Groundwater	1E-05	1
Site and Background Totals		
Total Surface Soil and Groundwater	1E-05	1
FUTURE INDUSTRIAL WORKERS		
Surface Soil		
Site Risk	3E-05	0.2
Background Risk	0E+00	0.009
Site + Background Risk	3E-05	0.2
Groundwater		
Site Risk	4E-06	0.2
Background Risk	0E+00	0
Site + Background Risk	4E-06	0.2
Site Totals		
Total Surface Soil and Groundwater	3E-05	0.4
Site and Background Totals		
Total Surface Soil and Groundwater	3E-05	0.4

TABLE 5-50
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 3 OF 4

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
CHILD RESIDENTS		
Surface Soil		
Site Risk	3E-04	3 ⁽⁴⁾
Background Risk	0E+00	0.1
Site + Background Risk	3E-04	3 ⁽⁴⁾
Groundwater		
Site Risk	3E-05	4
Background Risk	0E+00	0
Site + Background Risk	3E-05	4
Site Totals		
Total Surface Soil and Groundwater	3E-04	7
Site and Background Totals		
Total Surface Soil and Groundwater	3E-04	7
ADULT RESIDENTS		
Surface Soil		
Site Risk	6E-05	0.3
Background Risk	0E+00	0.01
Site + Background Risk	6E-05	0.3
Groundwater		
Site Risk	3E-05	2 ⁽⁴⁾
Background Risk	0E+00	0
Site + Background Risk	3E-05	2 ⁽⁴⁾
Site Totals		
Total Surface Soil and Groundwater	9E-05	2
Site and Background Totals		
Total Surface Soil and Groundwater	9E-05	2

TABLE 5-50
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 4 OF 4

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
LIFELONG RESIDENTS		
Surface Soil		
Site Risk	4E-04	NA
Background Risk	0E+00	NA
Site + Background Risk	4E-04	NA
Groundwater		
Site Risk	6E-05	NA
Background Risk	0E+00	NA
Site + Background Risk	6E-05	NA
Site Totals		
Total Surface Soil and Groundwater	5E-04	NA
Site and Background Totals		
Total Surface Soil and Groundwater	5E-04	NA

Notes:

ILCR = Incremental Lifetime Cancer Risk

HI = Hazard Index

- 1 - Cancer risk or hazard index from only site-related chemicals detected at concentrations exceeding screening levels.
- 2 - Cancer risk or hazard index from only chemicals present at naturally occurring levels detected at concentrations exceeding screening levels. Aluminum was within background levels in surface soil. No chemical was detected within background levels in subsurface soil.
- 3 - Cancer risk or hazard index from all chemicals detected at concentrations exceeding screening levels.
- 4 - Hazard index for individual target organs were less than or equal to 1.

TABLE 5-51
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
SOUTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
FUTURE ADOLESCENT TRESPASSERS		
Subsurface Soil		
Site Risk ⁽¹⁾	3E-06	0.08
Background Risk ⁽²⁾	0E+00	0.008
Site + Background Risk ⁽³⁾	3E-06	0.09
FUTURE ADULT TRESPASSERS		
Subsurface Soil		
Site Risk	3E-06	0.05
Background Risk	0E+00	0.005
Site + Background Risk	3E-06	0.06
FUTURE LIFELONG TRESPASSERS		
Subsurface Soil		
Site Risk	6E-06	NA
Background Risk	0E+00	NA
Site + Background Risk	6E-06	NA
CURRENT/FUTURE CONSTRUCTION WORKERS		
Subsurface Soil		
Site Risk	3E-06	0.8
Background Risk	0E+00	1
Site + Background Risk	3E-06	2
FUTURE INDUSTRIAL WORKERS		
Subsurface Soil		
Site Risk	2E-05	0.3
Background Risk	0E+00	0.03
Site + Background Risk	2E-05	0.3
CHILD RESIDENTS		
Subsurface Soil		
Site Risk	1E-04	3 ⁽⁴⁾
Background Risk	0E+00	0.4
Site + Background Risk	1E-04	3 ⁽⁴⁾
ADULT RESIDENTS		
Subsurface Soil		
Site Risk	3E-05	0.3
Background Risk	0E+00	0.04
Site + Background Risk	3E-05	0.3

TABLE 5-51
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
SOUTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
LIFELONG RESIDENTS		
Subsurface Soil		
Site Risk	1E-04	NA
Background Risk	0E+00	NA
Site + Background Risk	1E-04	NA

Notes:

ILCR = Incremental Lifetime Cancer Risk

HI = Hazard Index

- 1 - Cancer risk or hazard index from only site-related chemicals detected at concentrations exceeding screening levels.
- 2 - Cancer risk or hazard index from only chemicals present at naturally occurring levels detected at concentrations exceeding screening levels. Manganese was within background levels in subsurface soil.
- 3 - Cancer risk or hazard index from all chemicals detected at concentrations exceeding screening levels.
- 4 - Hazard index for individual target organs were less than or equal to 1.

TABLE 5-52
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
CURRENT ADOLESCENT TRESPASSERS		
Surface Soil		
Site Risk ⁽¹⁾	3E-06	0.07
Background Risk ⁽²⁾	9E-07	0.005
Site + Background Risk ⁽³⁾	4E-06	0.08
CURRENT ADULT TRESPASSERS		
Surface Soil		
Site Risk	2E-06	0.04
Background Risk	4E-07	0.003
Site + Background Risk	2E-06	0.04
CURRENT LIFELONG TRESPASSERS		
Surface Soil		
Site Risk	5E-06	NA
Background Risk	1E-06	NA
Site + Background Risk	6E-06	NA
CURRENT INDUSTRIAL WORKERS		
Surface Soil		
Site Risk	1E-05	0.2
Background Risk	3E-06	0.02
Site + Background Risk	1E-05	0.2
FUTURE ADOLESCENT TRESPASSERS		
Surface Soil		
Site Risk	3E-05	0.07
Background Risk	9E-07	0.005
Site + Background Risk	3E-05	0.08
FUTURE ADULT TRESPASSERS		
Surface Soil		
Site Risk	6E-06	0.04
Background Risk	4E-07	0.003
Site + Background Risk	6E-06	0.04
FUTURE LIFELONG TRESPASSERS		
Surface Soil		
Site Risk	3E-05	NA
Background Risk	1E-06	NA
Site + Background Risk	3E-05	NA

TABLE 5-52
RISKS ASSOCIATED WITH NATURALLY OCCURRING CHEMICALS
PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

Receptor	Reasonable Maximum Exposures	
	ILCR	HI
CURRENT/FUTURE CONSTRUCTION WORKERS		
Surface Soil		
Site Risk	2E-06	1
Background Risk	2E-06	0.2
Site + Background Risk	4E-06	1
FUTURE INDUSTRIAL WORKERS		
Surface Soil		
Site Risk	5E-05	0.2
Background Risk	3E-06	0.02
Site + Background Risk	5E-05	0.2
CHILD RESIDENTS		
Surface Soil		
Site Risk	5E-04	3 ⁽⁴⁾
Background Risk	5E-05	0.2
Site + Background Risk	6E-04	3 ⁽⁴⁾
ADULT RESIDENTS		
Surface Soil		
Site Risk	9E-05	0.3
Background Risk	7E-06	0.02
Site + Background Risk	1E-04	0.3
LIFELONG RESIDENTS		
Surface Soil		
Site Risk	5E-04	NA
Background Risk	5E-05	NA
Site + Background Risk	6E-04	NA

Notes:

ILCR = Incremental Lifetime Cancer Risk

HI = Hazard Index

- 1 - Cancer risk or hazard index from only site-related chemicals detected at concentrations exceeding screening levels.
- 2 - Cancer risk or hazard index from only chemicals present at naturally occurring levels detected at concentrations exceeding screening levels. Aluminum and chromium were within background levels in surface soil. No chemicals were within background levels in subsurface soil.
- 3 - Cancer risk or hazard index from all chemicals detected at concentrations exceeding screening levels.
- 4 - Hazard index for individual target organs were less than or equal to 1.

TABLE 5-53
CHEMICALS RETAINED AS CHEMICALS OF CONCERN
NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical	Receptor											
	Current Adolescent Trespassers	Current Adult Trespassers	Current Lifelong Trespassers	Current Industrial Workers	Future Adolescent Trespassers	Future Adult Trespassers	Future Lifelong Trespassers	Current/Future Construction Workers	Future Industrial Workers	Hypothetical Child Residents	Hypothetical Adult Residents	Hypothetical Lifelong Residents
Surface Soil												
No COCs were identified for surface soil.												
Subsurface Soil												
No COCs were identified for subsurface soil.												
Groundwater												
Trichloroethene										X	X	X

X - Chemical is retained as a chemical of concern (COC).

A chemical is retained as a COC if it contributed to a total cancer risk greater than 1×10^{-4} or to a target organ hazard index greater than 1.

TABLE 5-54
CHEMICALS RETAINED AS CHEMICALS OF CONCERN
CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical	Receptor											
	Current Adolescent Trespassers	Current Adult Trespassers	Current Lifelong Trespassers	Current Industrial Workers	Future Adolescent Trespassers	Future Adult Trespassers	Future Lifelong Trespassers	Current/Future Construction Workers	Future Industrial Workers	Hypothetical Child Residents	Hypothetical Adult Residents	Hypothetical Lifelong Residents
Surface Soil												
No COCs were identified for surface soil.												
Subsurface Soil												
No COCs were identified for subsurface soil.												
Groundwater												
Arsenic									X	X	X	X
Cobalt										X	X	X
Iron										X	X	X
Manganese									X	X	X	X

X - Chemical is retained as a chemical of concern (COC).

A chemical is retained as a COC if it contributed to a total cancer risk greater than 1×10^{-4} or to a target organ hazard index greater than 1.

TABLE 5-55
CHEMICALS RETAINED AS CHEMICALS OF CONCERN
FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Chemical	Receptor											
	Current Adolescent Trespassers	Current Adult Trespassers	Current Lifelong Trespassers	Current Industrial Workers	Future Adolescent Trespassers	Future Adult Trespassers	Future Lifelong Trespassers	Current/Future Construction Workers	Future Industrial Workers	Hypothetical Child Residents	Hypothetical Adult Residents	Hypothetical Lifelong Residents
Surface Soil												
Benzo(a)anthracene										X		X
Benzo(a)pyrene										X		X
Benzo(b)fluoranthene										X		X
Dibenzo(a,h)anthracene										X		X
Arsenic										X		X
Chromium VI										X		X
Subsurface Soil												
No COCs were identified for subsurface soil.												
Groundwater												
Manganese										X		

X - Chemical is retained as a chemical of concern (COC).

A chemical is retained as a COC if it contributed to a total cancer risk greater than 1×10^{-4} or to a target organ hazard index greater than 1.

**TABLE 5-56
CHEMICALS RETAINED AS CHEMICALS OF CONCERN
SOUTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND**

Chemical	Receptor											
	Current Adolescent Trespassers	Current Adult Trespassers	Current Lifelong Trespassers	Current Industrial Workers	Future Adolescent Trespassers	Future Adult Trespassers	Future Lifelong Trespassers	Current/Future Construction Workers	Future Industrial Workers	Hypothetical Child Residents	Hypothetical Adult Residents	Hypothetical Lifelong Residents
Subsurface Soil												
No COCs were identified for subsurface soil.												

X - Chemical is retained as a chemical of concern (COC).

A chemical is retained as a COC if it contributed to a total cancer risk greater than 1×10^{-4} or to a target organ hazard index greater than 1.

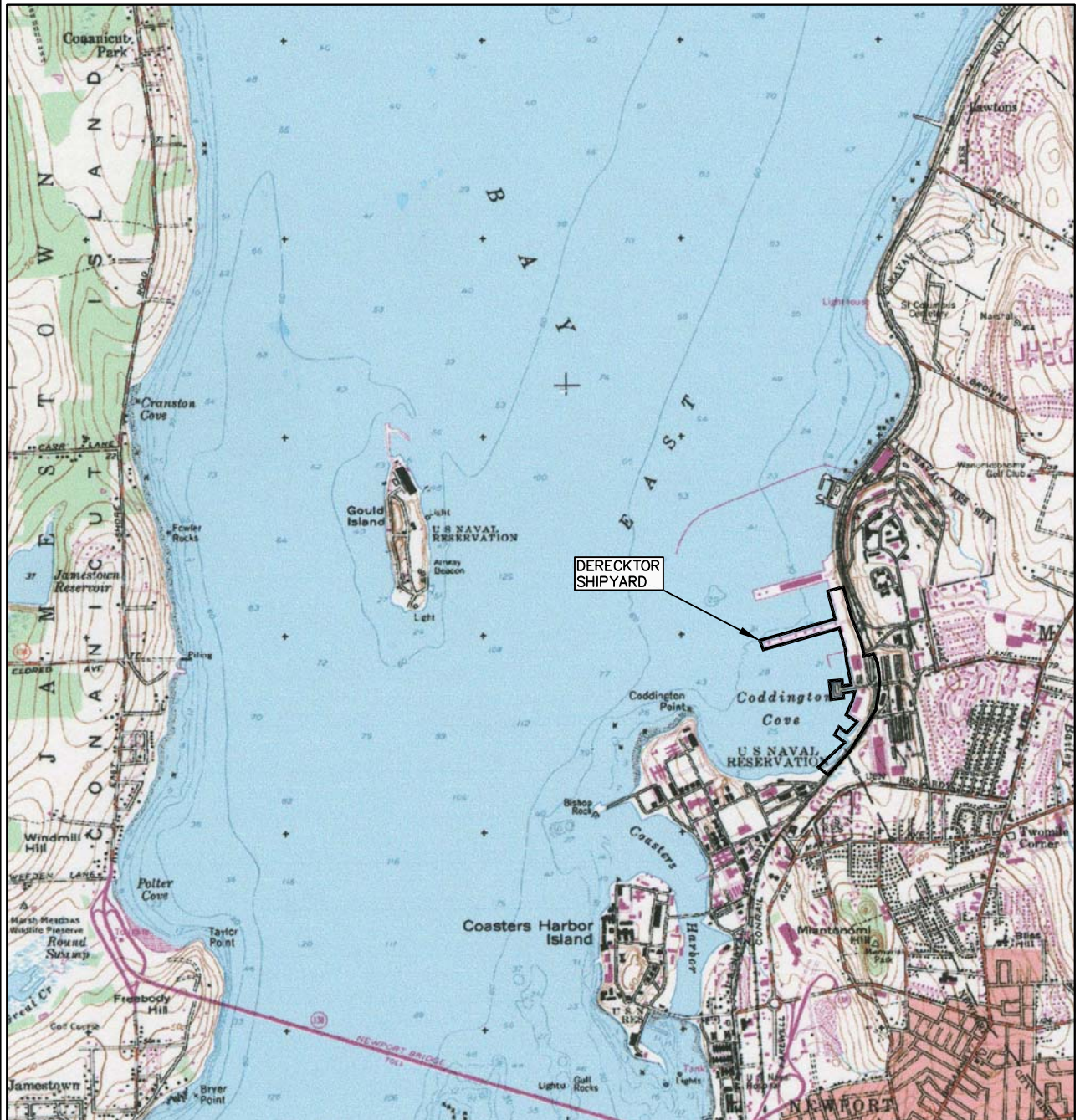
**TABLE 5-57
CHEMICALS RETAINED AS CHEMICALS OF CONCERN
PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND**

Chemical	Receptor											
	Current Adolescent Trespassers	Current Adult Trespassers	Current Lifelong Trespassers	Current Industrial Workers	Future Adolescent Trespassers	Future Adult Trespassers	Future Lifelong Trespassers	Current/Future Construction Workers	Future Industrial Workers	Hypothetical Child Residents	Hypothetical Adult Residents	Hypothetical Lifelong Residents
Surface Soil												
Benzo(a)anthracene										X		X
Benzo(a)pyrene										X		X
Benzo(b)fluoranthene										X		X
Benzo(k)fluoranthene												X
Dibenzo(a,h)anthracene										X		X
Indeno(1,2,3-cd)pyrene										X		X
Total Aroclors												X
Arsenic										X		X
Subsurface Soil												
Benzo(a)pyrene												X
Benzo(b)fluoranthene												X
Dibenzo(a,h)anthracene												X
Arsenic										X		X
Chromium VI												X

X - Chemical is retained as a chemical of concern (COC).

A chemical is retained as a COC if it contributed to a total cancer risk greater than 1×10^{-4} or to a target organ hazard index greater than 1.

FIGURES



BASE MAP IS A PORTION OF THE FOLLOWING 7.5 X 15 MINUTE U.S.G.S. QUADRANGLE:
PRUDENCE ISLAND, RHODE ISLAND, 1955, PHOTOREVISED 1970 AND 1975



NAVAL STATION NEWPORT
PORTSMOUTH, RHODE ISLAND

SITE LOCUS

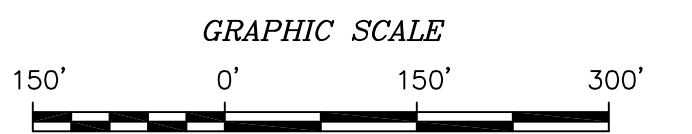
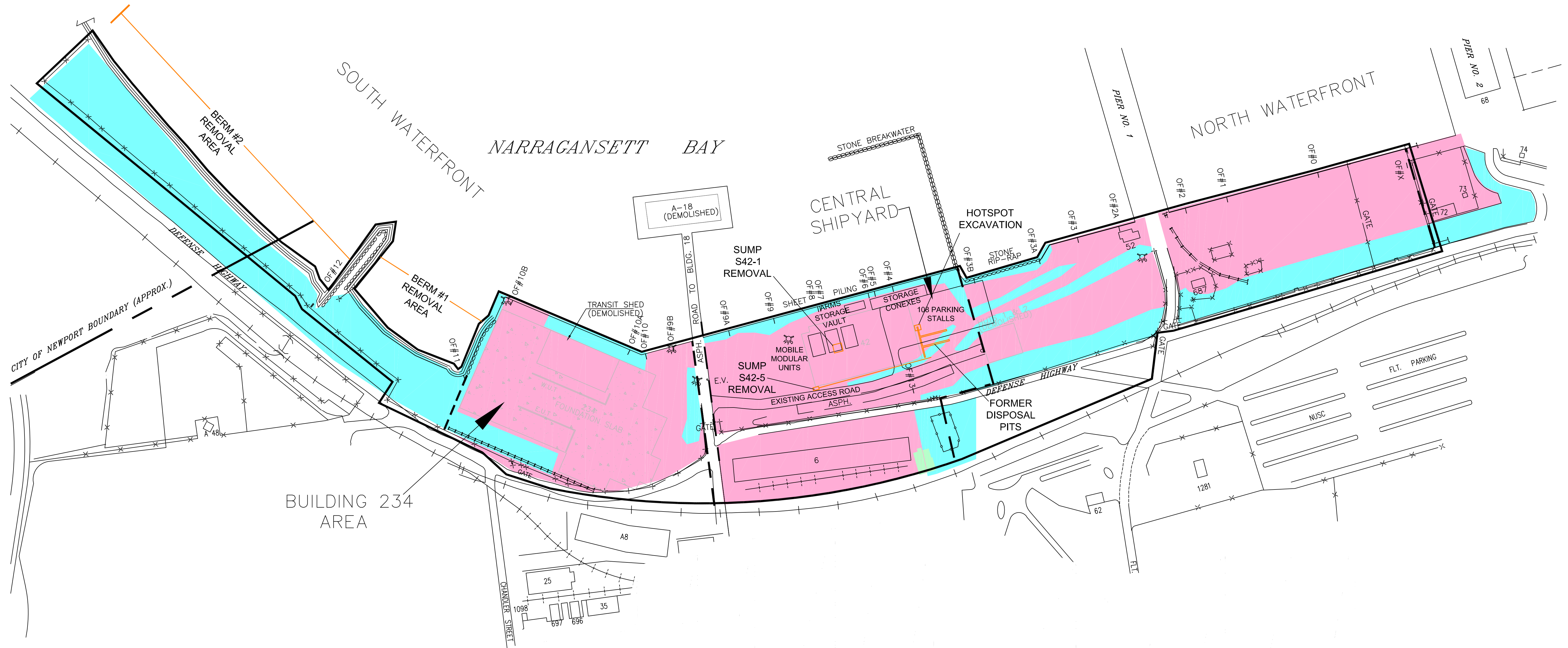
ON-SHORE DEREKTOR SHIPYARD
STUDY AREA SCREENING EVALUATION ADDENDUM

SCALE
PER SCALE BAR

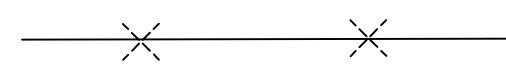
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1-1



LEGEND



FENCE

OF#10A

OUTFALL LOCATION WITH IDENTIFIER



HYDRANT LOCATION

A-18

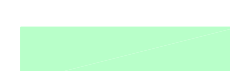
BUILDING AND NUMBER



PAVED AREA



UNPAVED AREA



PCB REMOVAL AREA



REMOVAL AREA



SITE BOUNDARY

NOTES:

1. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.
2. PLAN NOT TO BE USED FOR DESIGN.
3. COMPILED FROM ACTUAL FIELD SURVEY PLAN BY LOUIS FEDERICI & ASSOC., PROVIDENCE, RI AND U.S. NAVY PLANS



TETRA TECH

NAVAL STATION NEWPORT
PORTSMOUTH, RHODE ISLAND

CURRENT SITE FEATURES

ON-SHORE DERECKTOR SHIPYARD
STUDY AREA SCREENING EVALUATION ADDENDUM

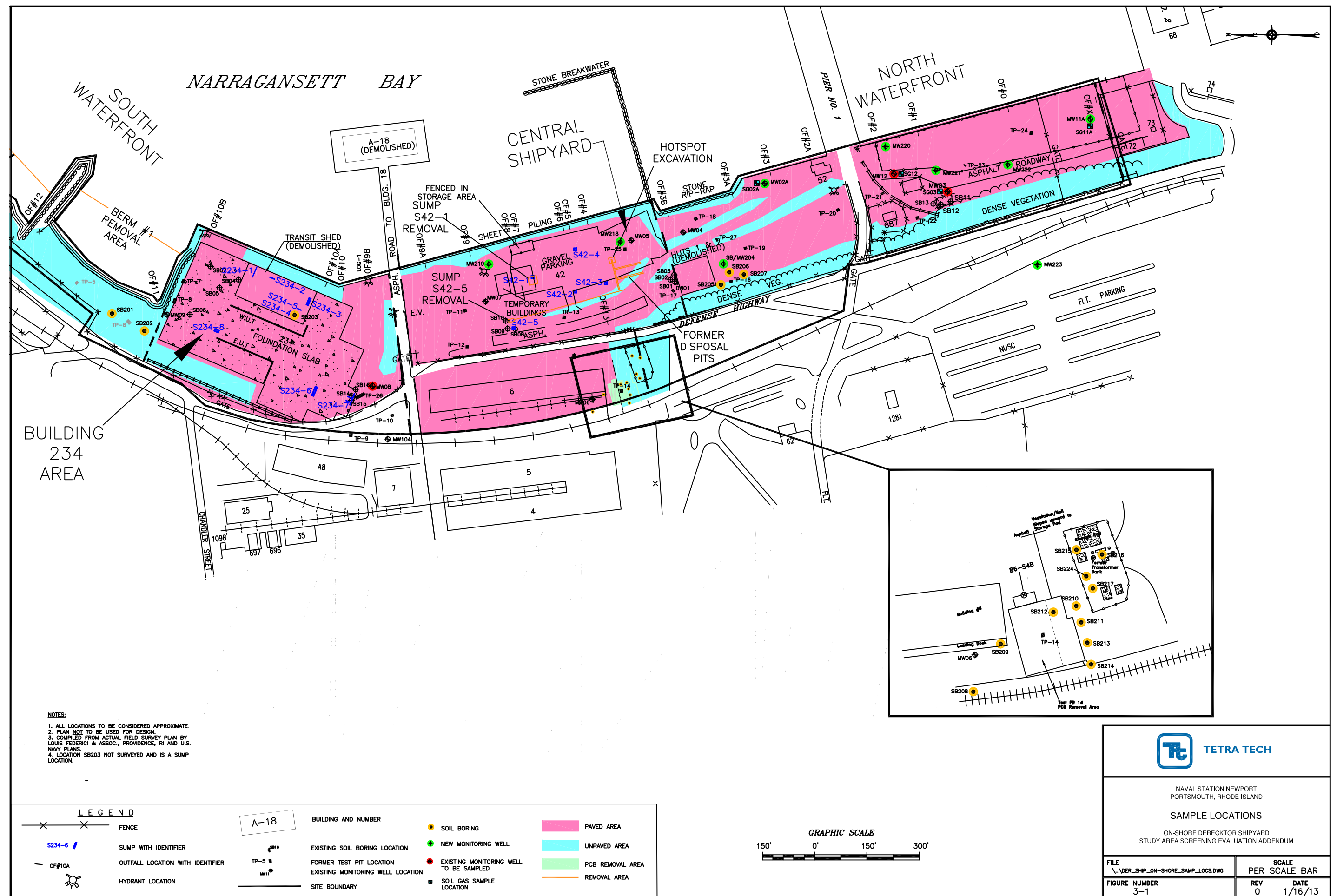
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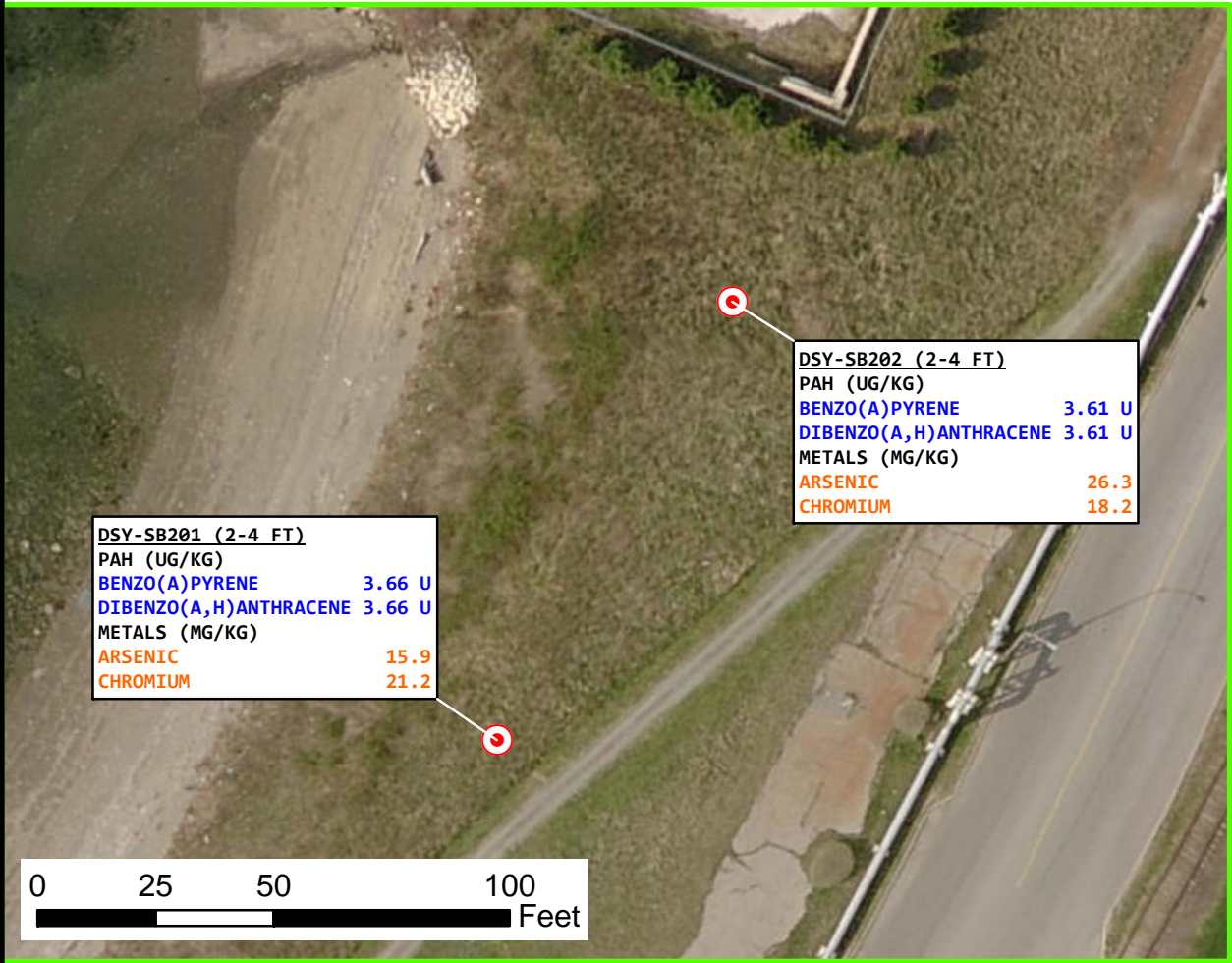
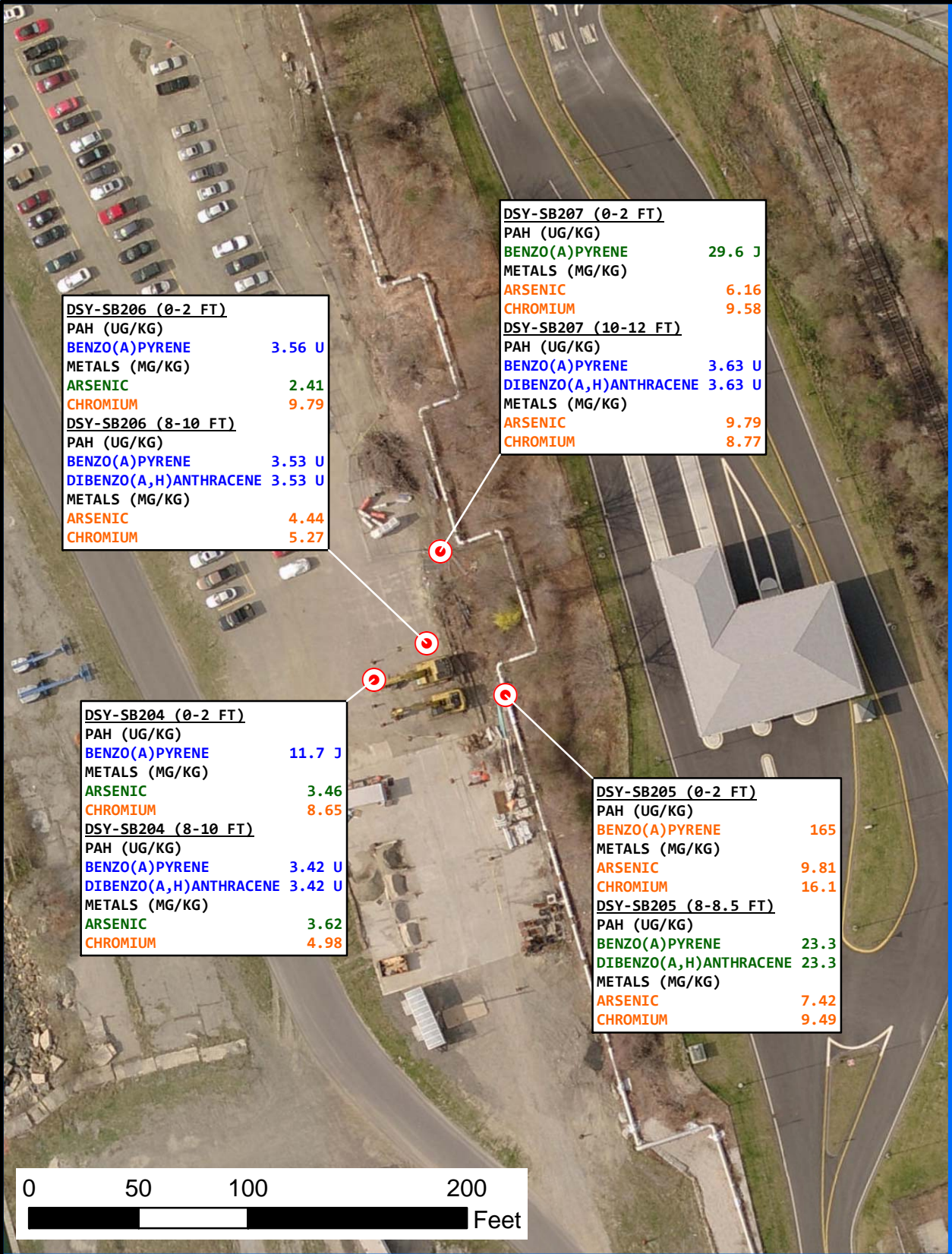
FIGURE NUMBER
1-2

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PER SCALE BAR

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1/16/13





Legend

Soil Boring

Aerial photo: Rhode Island E911
Uniform Emergency Telephone System,
Pictometry International Corporation, 2008.

CHEMICAL RESULT > 100 times SL
CHEMICAL RESULT > 10 times SL
CHEMICAL RESULT > SL
CHEMICAL RESULT <= SL

The screening level (SL) is the PAL as
described in Worksheet # 11 of the SAP.



NAVAL STATION NEWPORT NEWPORT, RHODE ISLAND

SOUTHERN AND NORTHERN WATERFRONT SOIL RESULTS

FORMER DERECKTOR SHIPYARD STUDY AREA SCREENING EVALUATION ADDENDUM	
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SCALE	PER SCALE BAR
FIGURE NUMBER	4-1
REV	0
DATE	01/16/13



DSY-MW219

VOCs (UG/L)	
1,1-DCE	0.5 U
ACETONE	2.89 J
CIS-1,2-DCE	0.5 U
TRANS-1,2-DCE	0.5 U
TRICHLOROETHENE	0.5 U
TRICHLOROFLUOROMETHANE	1 U
VINYL CHLORIDE	0.5 U
METALS (UG/L)	
ARSENIC	76.3 J
METALS (FILT) (UG/L)	
ARSENIC	78 J

DSY-MW218

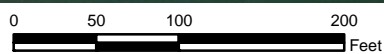
VOCs (UG/L)	
1,1-DCE	0.5 U
ACETONE	5 U
CIS-1,2-DCE	0.5 U
TRANS-1,2-DCE	0.5 U
TRICHLOROETHENE	0.5 U
TRICHLOROFLUOROMETHANE	1 U
VINYL CHLORIDE	0.5 U
METALS (UG/L)	
ARSENIC	27.8
METALS (FILT) (UG/L)	
ARSENIC	29.1

DSY-MW08

VOCs (UG/L)	
1,1-DCE	0.25 J
ACETONE	5 U
CIS-1,2-DCE	12.7
TRANS-1,2-DCE	0.5 U
TRICHLOROETHENE	3.9
TRICHLOROFLUOROMETHANE	0.581 J
VINYL CHLORIDE	0.263 J
METALS (UG/L)	
ARSENIC	1.32 J
METALS (FILT) (UG/L)	
ARSENIC	1.37 J

CHEMICAL RESULT > 100 times SL
 CHEMICAL RESULT > 10 times SL
 CHEMICAL RESULT > SL
 CHEMICAL RESULT <= SL

The screening level (SL) is the PAL as described in Worksheet # 11 of the SAP.
 Aerial photo: Rhode Island E911 Uniform Emergency Telephone System, Pictometry International Corporation, 2008.



Legend



Monitoring Well



NAVAL STATION NEWPORT
 NEWPORT, RHODE ISLAND

VOCs IN GROUNDWATER - CENTRAL WATERFRONT

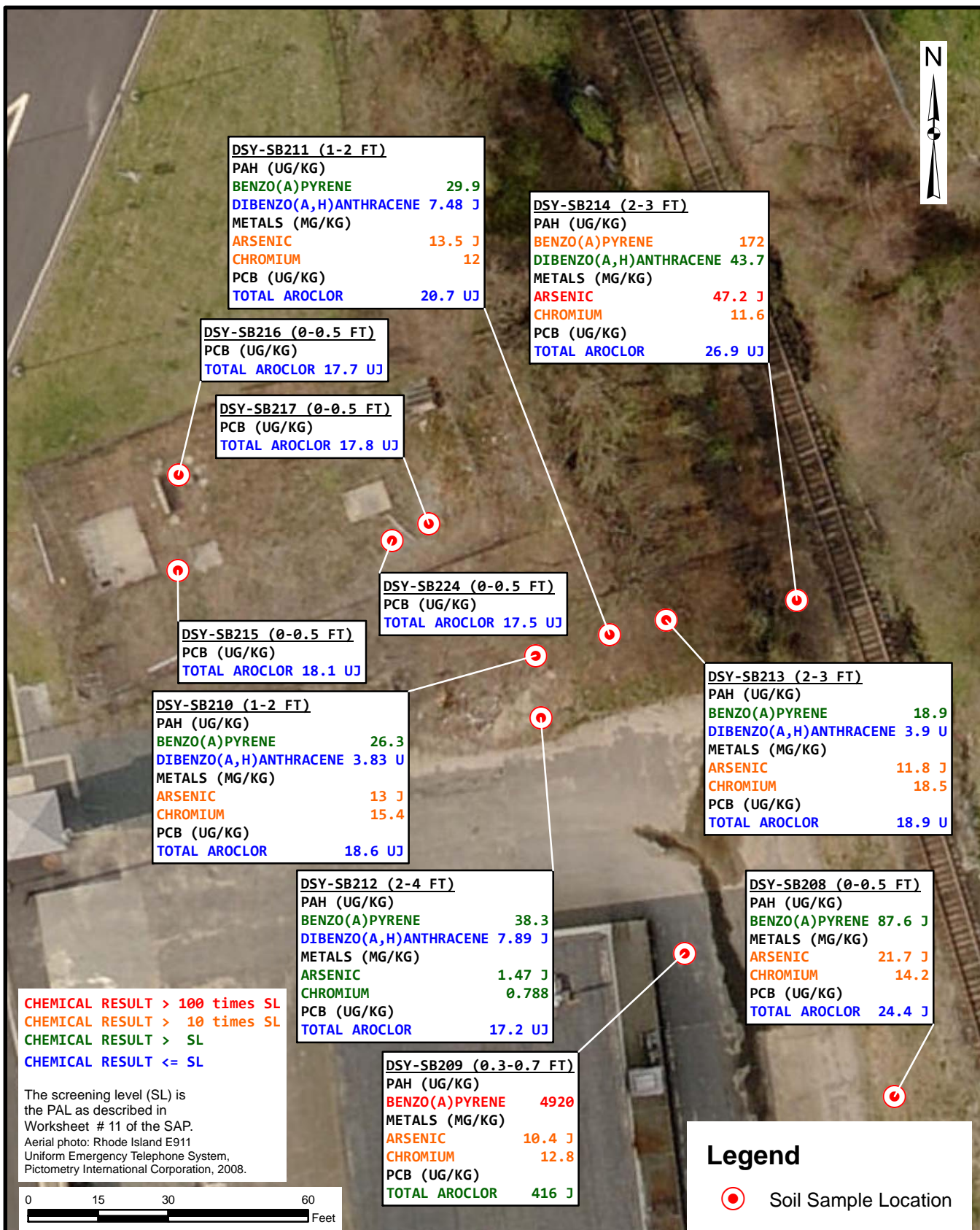
FORMER DERECKTOR SHIPYARD
 STUDY AREA SCREENING EVALUATION ADDENDUM

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FIGURE NUMBER
 4-2



DSY-MW11A
VOCs (UG/L)
 1,1-DCE 0.5 U
 ACETONE 5 U
 CIS-1,2-DCE 0.322 J
 TRANS-1,2-DCE 0.676 J
 TRICHLOROETHENE 5.06
 TRICHLOROFUOROMETHANE 1 U
 VINYL CHLORIDE 0.5 U

DSY-MW222
VOCs (UG/L)
 1,1-DCE 0.5 U
 ACETONE 5 U
 CIS-1,2-DCE 0.5 U
 TRANS-1,2-DCE 0.5 U
 TRICHLOROETHENE 5.48
 TRICHLOROFUOROMETHANE 1 U
 VINYL CHLORIDE 0.5 U

DSY-MW223
VOCs (UG/L)
 1,1-DCE 0.5 U
 ACETONE 5 U
 CIS-1,2-DCE 0.5 U
 TRANS-1,2-DCE 0.5 U
 TRICHLOROETHENE 0.5 U
 TRICHLOROFUOROMETHANE 1 U
 VINYL CHLORIDE 0.5 U

DSY-MW03
VOCs (UG/L)
 1,1-DCE 0.5 U
 ACETONE 5 UJ
 CIS-1,2-DCE 0.5 U
 TRANS-1,2-DCE 0.5 U
 TRICHLOROETHENE 7.35
 TRICHLOROFUOROMETHANE 1 UJ
 VINYL CHLORIDE 0.5 U

DSY-MW12
VOCs (UG/L)
 1,1-DCE 0.5 U
 ACETONE 5 U
 CIS-1,2-DCE 3.73
 TRANS-1,2-DCE 4.81
 TRICHLOROETHENE 9.61
 TRICHLOROFUOROMETHANE 1 U
 VINYL CHLORIDE 0.5 U

DSY-MW221
VOCs (UG/L)
 1,1-DCE 0.5 U
 ACETONE 5 U
 CIS-1,2-DCE 1.49
 TRANS-1,2-DCE 0.5 U
 TRICHLOROETHENE 12.2
 TRICHLOROFUOROMETHANE 1 U
 VINYL CHLORIDE 0.5 U

DSY-MW220
VOCs (UG/L)
 1,1-DCE 0.5 U
 ACETONE 5 U
 CIS-1,2-DCE 4.26
 TRANS-1,2-DCE 1.1
 TRICHLOROETHENE 0.5 U
 TRICHLOROFUOROMETHANE 1 U
 VINYL CHLORIDE 1.47

DSY-MW02A
VOCs (UG/L)
 1,1-DCE 0.5 U
 ACETONE 5 UJ
 CIS-1,2-DCE 0.291 J
 TRANS-1,2-DCE 0.5 U
 TRICHLOROETHENE 0.5 U
 TRICHLOROFUOROMETHANE 1 UJ
 VINYL CHLORIDE 0.5 U

DSY-MW04
VOCs (UG/L)
 1,1-DCE 0.5 U
 ACETONE 5 U
 CIS-1,2-DCE 0.5 U
 TRANS-1,2-DCE 0.5 U
 TRICHLOROETHENE 3.16
 TRICHLOROFUOROMETHANE 1 U
 VINYL CHLORIDE 0.5 U
METALS (UG/L)
 ARSENIC 1.5 UJ
METALS (FILT) (UG/L)
 ARSENIC 1.5 UJ

CHEMICAL RESULT > 100 times SL
 CHEMICAL RESULT > 10 times SL
 CHEMICAL RESULT > SL
 CHEMICAL RESULT <= SL

The screening level (SL) is the PAL as described in Worksheet # 11 of the SAP.
 Aerial photo: Rhode Island E911 Uniform Emergency Telephone System, Pictometry International Corporation, 2008.

0 75 150 300
 Feet



Legend



Monitoring Well



NAVAL STATION NEWPORT
 NEWPORT, RHODE ISLAND

VOCs IN GROUNDWATER - NORTHERN WATERFRONT

FORMER DERECKTOR SHIPYARD
 STUDY AREA SCREENING EVALUATION ADDENDUM

SCALE
 PER SCALE BAR

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FIGURE NUMBER
 4-4



DSY-SG11A	
VOCs (UG/M3)	
1,3-BUTADIENE	13
ACRYLONITRILE	2.8
BENZENE	6.8
TETRACHLOROETHENE	12
TRICHLOROETHENE	120

DSY-SG03	
VOCs (UG/M3)	
1,3-BUTADIENE	2.3
ACRYLONITRILE	1.5 U
BENZENE	0.69
TETRACHLOROETHENE	1.05
TRICHLOROETHENE	7.75

DSY-SG12	
VOCs (UG/M3)	
1,3-BUTADIENE	6.4
ACRYLONITRILE	1.8 U
BENZENE	4.8
TETRACHLOROETHENE	1.5
TRICHLOROETHENE	1.3

CHEMICAL RESULT > 100 times SL
 CHEMICAL RESULT > 10 times SL
 CHEMICAL RESULT > SL
 CHEMICAL RESULT <= SL

The screening level (SL) is the PAL as described in Worksheet # 11 of the SAP.
 Aerial photo: Rhode Island E911 Uniform Emergency Telephone System, Pictometry International Corporation, 2008.

0 50 100 200
 Feet

Legend

● Soil Gas Sample



NAVAL STATION NEWPORT
 NEWPORT, RHODE ISLAND

VOCs IN SOIL GAS - NORTHERN WATERFRONT

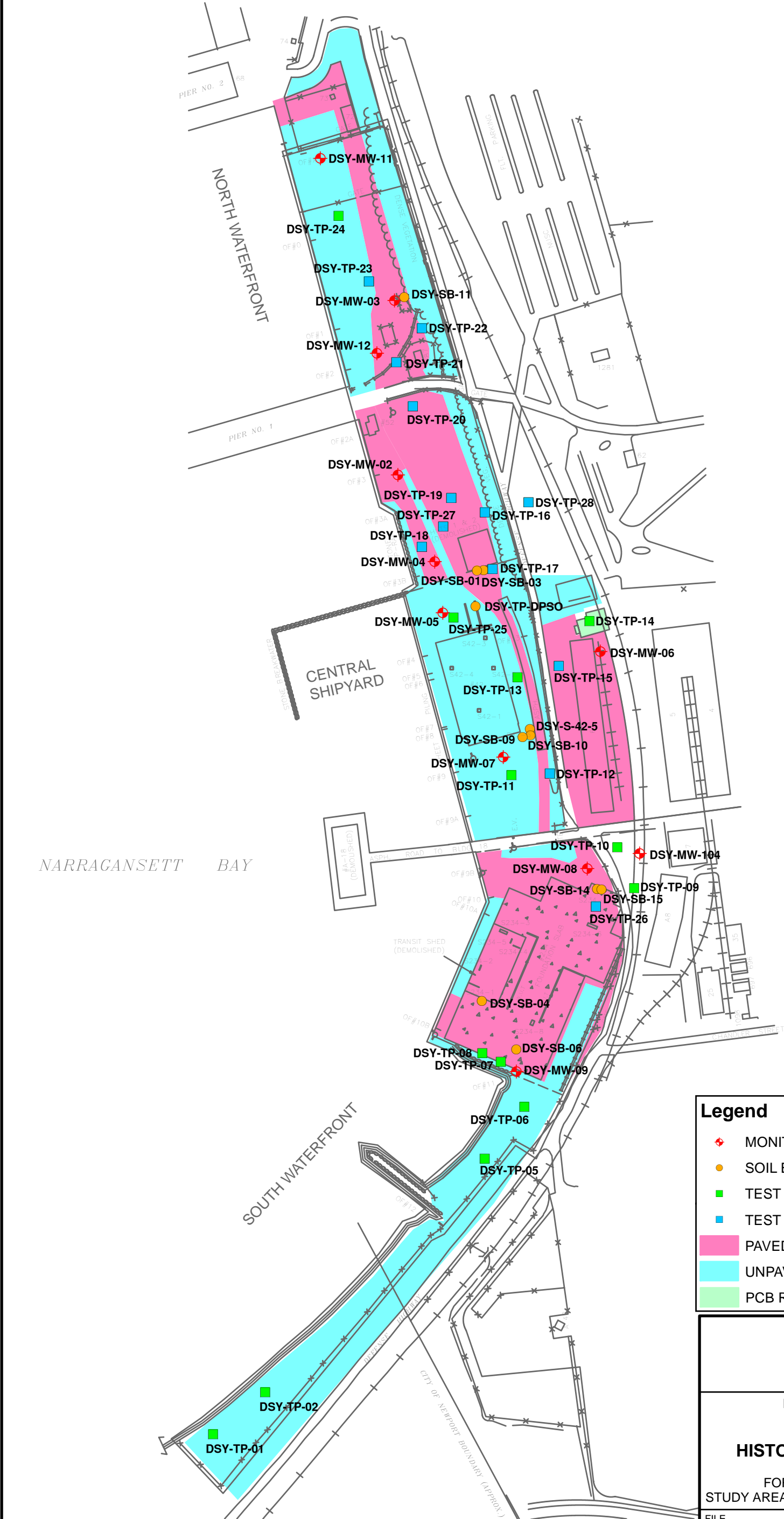
FORMER DERECKTOR SHIPYARD
 STUDY AREA SCREENING EVALUATION ADDENDUM

SCALE
 PER SCALE BAR

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 4-5



Legend

MONITORING WELL LOCATION

SOIL BORING LOCATION

TEST PIT LOCATION

TEST PIT LOCATION (UNDER PAVEMENT)

PAVED AREA

UNPAVED AREA

PCB REMOVAL AREA

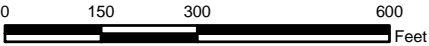


NAVAL STATION NEWPORT
NEWPORT, RHODE ISLAND

HISTORIC SAMPLE LOCATIONS

FORMER DEREKTOR SHIPYARD
STUDY AREA SCREENING EVALUATION ADDENDUM

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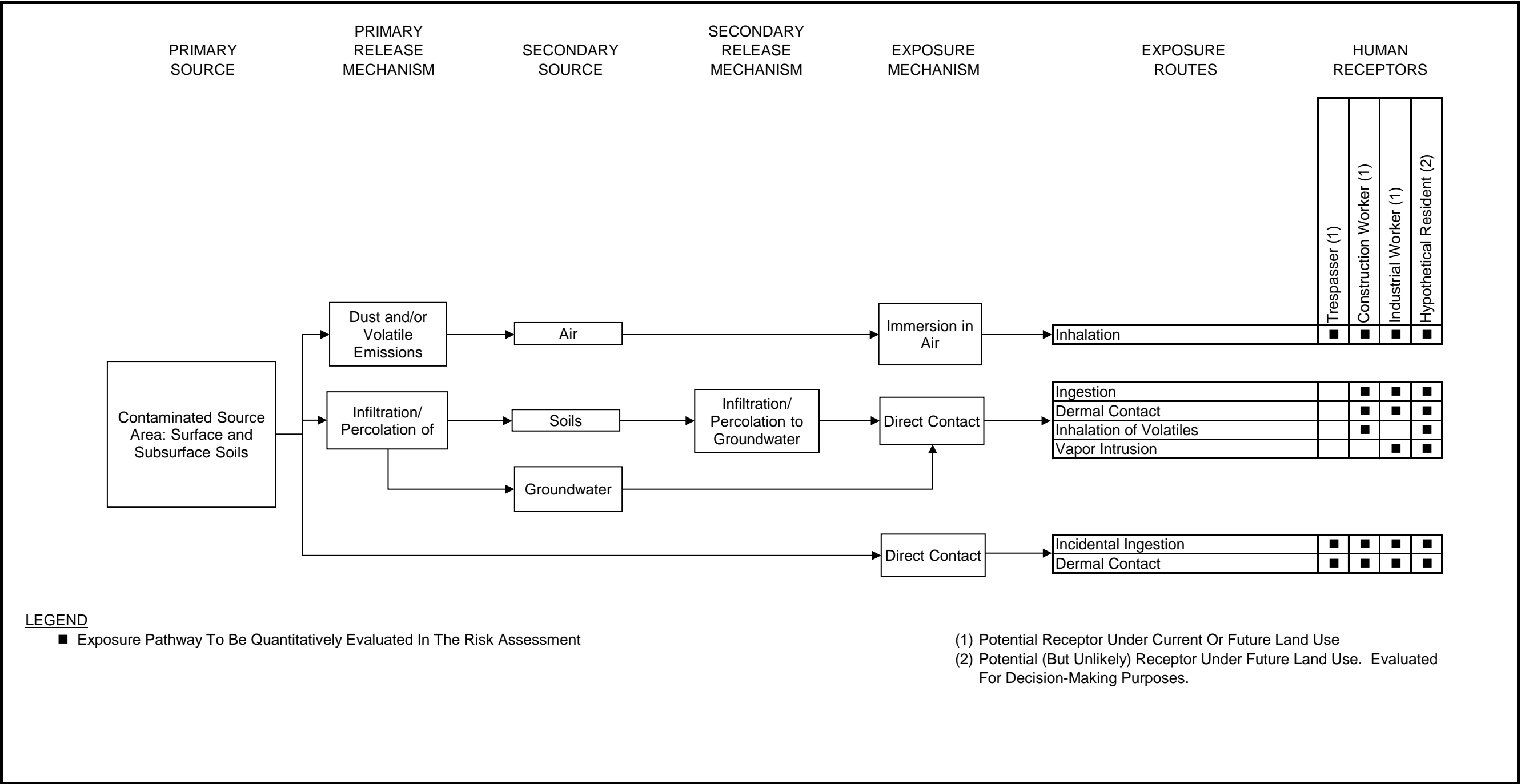


FIGURE 5-2

HUMAN HEALTH CONCEPTUAL SITE MODEL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

REFERENCES

REFERENCES

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APPENDIX A
FIELD DOCUMENTATION FORMS

A-1 SOIL SAMPLE LOG SHEETS

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-SB204-SO-0810** Sampler: Robin Clark
 Location ID: DSY-SB204 MS/MSD: NA
 QC Duplicate ID: N/A

Sample Information

Date	02/11/11	Concentration	Not known
Sample Source	Subsurface Soil-SB	Sample Data Type	Grab

Sample Details

Date	Time	method	Monitor	Depth	Color	Notes
02/11/11	12:11	Split spoon	N/A	S-5	On Boring Log	None

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/11/11	12:11	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/11/11	12:11	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/11/11	12:11	VOCs	SW-846 8260B	4°C/MeOH	3	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-1
✓	02/11/11	12:11	Percent Moisture for VOCs	Percent Moisture	None	1	Glass - Clear	2 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/11/11	12:11	DRO	SW-846 8015B.	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/11/11	12:11	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-1

General Notes

None

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-SB205-SO-0002** Sampler: Miki Alroy
 Location ID: DSY-SB205 MS/MSD: MS/MSD
 QC Duplicate ID: N/A

Sample Information

Date	N/A	Concentration	N/A
Sample Source	N/A	Sample Data Type	N/A

Sample Details

Date	Time	method	Monitor	Depth	Color	Notes
02/15/11	12:10	Trowel	N/A	S-1	On Boring Log	None

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/15/11	12:10	VOCs	SW-846 8260B	4°C/MeOH+DI Combo	9	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-1
✓	02/15/11	12:10	Percent Moisture for VOCs	Percent Moisture	None	3	Glass - Clear	2 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/15/11	12:10	DRO	SW-846 8015B.	4°C	3	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/15/11	12:10	Metals	SW-846 6010B	4°C	2	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/15/11	12:10	PAHs	SW-846 8270C	4°C	3	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/15/11	12:10	GRO	SW-846 8015B	4°C/MeOH	3	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-1

General Notes

None

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-SB206-SO-0002** Sampler: Miki Alroy
 Location ID: DSY-SB206 MS/MSD: NA
 QC Duplicate ID: N/A

Sample Information

Date	02/14/11	Concentration	Not known
Sample Source	Surface Soil-SS	Sample Data Type	Grab

Sample Details

Date	Time	method	Monitor	Depth	Color	Notes
02/14/11	14:55	Split spoon	N/A	S-1	On Boring Log	None

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/14/11	14:55	VOCs	SW-846 8260B	4°C/MeOH	3	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-1
✓	02/14/11	14:55	Percent Moisture for VOCs	Percent Moisture	None	1	Plastic - PE	2 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/14/11	14:55	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/14/11	14:55	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-1
✓	02/14/11	14:55	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/14/11	14:55	DRO	SW-846 8015B.	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1

General Notes

None

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derricks Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-SB207-SO-0002** Sampler: Robin Clark
 Location ID: DSY-SB207 MS/MSD: NA
 QC Duplicate ID: N/A

Sample Information

Date	02/15/11	Concentration	Not known
Sample Source	Surface Soil-SS	Sample Data Type	Grab

Sample Details

Date	Time	method	Monitor	Depth	Color	Notes
02/15/11	9:05	Split spoon	N/A	S-1	On Boring Log	None

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/15/11	9:05	VOCs	SW-846 8260B	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-1
✓	02/15/11	9:05	Percent Moisture for VOCs	Percent Moisture	None	1	Glass - Clear	2 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/15/11	9:05	PAHs	SW-846 8270C	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/15/11	9:05	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1
✓	02/15/11	9:05	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-1
✓	02/15/11	9:05	DRO	SW-846 8015B.	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-1

General Notes

None

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

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Sample ID: **DSY-SO-SB208-000.5**
 Location ID: DSY-SB208
 QC Duplicate ID: DSY-SO-DUP02-0211

Sampler: Miki Alroy
 MS/MSD: MS/MSD

Sample Information

Date	02/25/11	Concentration	Not known
Sample Source	Surface Soil-SS	Sample Data Type	Grab

Sample Details

Date	Time	method	Monitor	Depth	Color	Notes
02/25/11	13:12	Hand auger	N/A	S-1	dark brown	Dark Brown f-c SAND and SILT little Gravel

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/25/11	13:12	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:12	PCBs	SW-846 8082	4°C	3	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	Run MS/MSD	ED00000152-3
✓	02/25/11	13:12	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:12	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:12	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-3

General Notes

None

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

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Sample ID: **DSY-SO-SB209-0.30.7** Sampler: Miki Alroy
 Location ID: DSY-SB209 MS/MSD: NA
 QC Duplicate ID: N/A

Sample Information

Date	02/25/11	Concentration	Not known
Sample Source	Surface Soil-SS	Sample Data Type	Grab

Sample Details

Date	Time	method	Monitor	Depth	Color	Notes
02/25/11	10:05	DPT	N/A	S-1	brown	Damp Dense Gravel some F/C Sand little Silt

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/25/11	10:05	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	10:05	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	10:05	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	10:05	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	10:05	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-3

General Notes

Soil sample collected from hand auger boring from 0.3' to 0.7' bgs.

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derricks Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-SO-SB210-0102** Sampler: Miki Alroy
 Location ID: DSY-SB210 MS/MSD: NA
 QC Duplicate ID: N/A

Sample Information

Date	02/25/11	Concentration	Not known
Sample Source	Surface Soil-SS	Sample Data Type	Grab

Sample Details

Date	Time	method	Monitor	Depth	Color	Notes
02/25/11	12:30	DPT	N/A	S-1	brown	Damp Loose Brown SILT some Gravel little F/C Sand

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/25/11	12:30	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	12:30	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	12:30	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	12:30	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	12:30	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-3

General Notes

None

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

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Sample ID: **DSY-SO-SB211-0102** Sampler: Miki Alroy
 Location ID: DSY-SB211 MS/MSD: NA
 QC Duplicate ID: N/A

Sample Information

Date	02/25/11	Concentration	Not known
Sample Source	Surface Soil-SS	Sample Data Type	Grab

Sample Details

Date	Time	method	Monitor	Depth	Color	Notes
02/25/11	13:30	Hand auger	N/A	S-1	dark brown	Damp D. Brown SILT little Gravel little F/C Sand

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/25/11	13:30	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:30	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:30	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:30	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:30	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-3

General Notes

None

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

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Sample ID: **DSY-SO-SB212-0204** Sampler: Miki Alroy
 Location ID: DSY-SB212 MS/MSD: NA
 QC Duplicate ID: N/A

Sample Information

Date	02/25/11	Concentration	Not known
Sample Source	Subsurface Soil-SB	Sample Data Type	Grab

Sample Details

Date	Time	method	Monitor	Depth	Color	Notes
08/30/11	7:54	DPT	N/A	S-1	brown	Damp Dense Gravel some F/C Sand little Silt

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/25/11	7:54	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	7:54	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	7:54	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	7:54	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-3
✓	02/25/11	7:54	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3

General Notes

None

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-SO-SB213-0203** Sampler: Miki Alroy
 Location ID: DSY-SB213 MS/MSD: NA
 QC Duplicate ID: N/A

Sample Information			
Date	02/25/11	Concentration	Not known
Sample Source	Surface Soil-SS	Sample Data Type	Grab

Sample Details						
Date	Time	method	Monitor	Depth	Color	Notes
02/25/11	13:20	Hand auger	N/A	S-1	grey-brown	Damp Dense Gravel some F/C Sand little Silt

Laboratory Analysis										
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/25/11	13:20	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:20	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:20	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:20	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:20	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-3

General Notes
None

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-SO-SB214-0203** Sampler: Miki Alroy
 Location ID: DSY-SB214 MS/MSD: NA
 QC Duplicate ID: N/A

Sample Information

Date	02/25/11	Concentration	Not known
Sample Source	Surface Soil-SS	Sample Data Type	Grab

Sample Details

Date	Time	method	Monitor	Depth	Color	Notes
02/25/11	13:35	Hand auger	N/A	S-1	dark brown	Wet Loose D. Brown F/C SAND some gravel little Silt

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/25/11	13:35	PAHs/DRO	SW-846 8270C/8015B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:35	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:35	Metals	SW-846 6010B	4°C	1	Glass - Amber	4 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:35	Percent Moisture for GRO	Percent Moisture.	4°C	1	Plastic - PE	2 oz. wide-mouth w/Tefl on cap	None	ED00000152-3
✓	02/25/11	13:35	GRO	SW-846 8015B	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	None	ED00000152-3

General Notes

None

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

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Sample ID: **DSY-SO-SB215-000.5** Sampler: Miki Alroy
 Location ID: DSY-SB215 MS/MSD: NA
 QC Duplicate ID: N/A

Sample Information			
Date	02/22/11	Concentration	Not known
Sample Source	Surface Soil-SS	Sample Data Type	Grab

Sample Details						
Date	Time	method	Monitor	Depth	Color	Notes
02/22/11	15:00	Hand auger	N/A	S-1	brown	Dry M. Dense F/C SAND and GRAVEL little Silt

Laboratory Analysis										
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/22/11	15:00	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	None	ED00000152-3

General Notes
None

SOIL LOG SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derricks Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

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Sample ID: **DSY-SO-SB216-000.5** Sampler: Miki Alroy
 Location ID: DSY-SB216 MS/MSD: NA
 QC Duplicate ID: N/A

Sample Information			
Date	02/22/11	Concentration	Not known
Sample Source	Surface Soil-SS	Sample Data Type	Grab

Sample Details						
Date	Time	method	Monitor	Depth	Color	Notes
02/22/11	15:35	Hand auger	N/A	S-1	brown	Dry M. Dense F/C SAND and GRAVEL little Silt

Laboratory Analysis										
Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/22/11	15:35	PCBs	SW-846 8082	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	None	ED00000152-3

General Notes
None

A-2 GROUNDWATER LOG SHEETS

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 3

Sample ID: **DSY-GW-MW02A-022411** Sampler: Amy Carey
 Well ID: DSY-MW02A Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information			
Well Diameter (in.)	2	Static Water Level (ft-BTOR)	11.64
Top of Screen (ft-BTOR)	16	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	26	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	26	Sample Method	Low Flow Bladder

Equipment			
Water Quality Meter:	N/A	Pump Control Box:	N/A
		Turbidity Meter:	N/A

Purge Information													
Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/24/11	9:51	11.65	100.0	Clear	Hydrogen sulfide - slight	8.40	0.819	0.72	5.92	6.4	64.7	0.40	NA
02/24/11	10:03	11.63	100.0	Clear	Hydrogen sulfide - slight	8.48	0.797	0.55	5.03	11.2	45.3	0.39	NA
02/24/11	10:09	11.60	250.0	Clear	Hydrogen sulfide - slight	8.51	0.831	0.63	6.53	12.7	32.7	0.42	NA
02/24/11	10:14	11.60	180.0	Clear	Hydrogen sulfide - slight	8.54	0.950	0.42	5.40	12.3	22.2	0.42	NA
02/24/11	10:19	11.60	180.0	Clear	Hydrogen sulfide - slight	8.55	0.835	0.32	5.16	12.2	12.4	0.41	NA
02/24/11	10:24	11.59	180.0	Clear	Hydrogen sulfide - slight	8.55	0.836	0.33	4.30	12.4	0.4	0.41	NA
02/24/11	10:29	11.58	180.0	Clear	Hydrogen sulfide - slight	8.57	0.834	0.32	4.30	12.3	-8.8	0.41	NA
02/24/11	10:34	11.59	180.0	Clear	Hydrogen sulfide - slight	8.57	0.831	0.32	5.03	12.2	-18.6	0.41	NA
02/24/11	10:39	11.55	180.0	Clear	Hydrogen sulfide - slight	8.57	0.827	0.30	3.54	12.0	-27.0	0.41	NA
02/24/11	10:44	11.55	180.0	Clear	Hydrogen sulfide - slight	8.57	0.827	0.29	3.66	12.1	-36.4	0.41	NA
02/24/11	10:49	11.55	180.0	Clear	Hydrogen sulfide - slight	8.57	0.822	0.27	4.22	12.1	-44.4	0.40	NA
02/24/11	10:54	11.55	180.0	Clear	Hydrogen sulfide - slight	8.57	0.822	0.29	4.05	12.1	-52.2	0.41	NA
02/24/11	10:59	11.55	180.0	Clear	Hydrogen sulfide - slight	8.57	0.819	0.28	3.68	12.4	-60.0	0.40	NA

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

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Sample ID: **DSY-GW-MW02A-022411**
 Well ID: DSY-MW02A
 QC Duplicate ID: N/A

Sampler: Amy Carey
 Well Type: Monitoring Well
 MS/MSD: N/A

02/24/11	11:04	11.55	180.0	Clear	Hydrogen sulfide - slight	8.58	0.817	0.24	3.81	12.4	-68.4	0.40	NA
02/24/11	11:10	11.52	180.0	Clear	Hydrogen sulfide - slight	8.57	0.811	0.26	3.10	12.3	-77.6	0.40	NA
02/24/11	11:16	11.50	180.0	Clear	Hydrogen sulfide - slight	8.57	0.817	0.24	3.24	12.1	-84.7	0.40	NA
02/24/11	11:20	11.48	180.0	Clear	Hydrogen sulfide - slight	8.58	0.812	0.24	2.97	11.9	-92.1	0.40	NA
02/24/11	11:26	11.49	180.0	Clear	Hydrogen sulfide - slight	8.58	0.816	0.22	3.06	12.0	-98.7	0.40	NA
02/24/11	11:30	11.50	180.0	Clear	Hydrogen sulfide - slight	8.57	0.811	0.23	2.82	12.0	-102.9	0.40	NA
02/24/11	11:35	11.45	100.0	Clear	Hydrogen sulfide - slight	8.58	0.807	0.23	3.43	12.0	-109.2	0.40	N/A
02/24/11	11:40	11.46	100.0	Clear	Hydrocarbon - slight	8.58	0.814	0.22	8.10	12.1	-115.5	0.40	N/A
02/24/11	11:45	11.45	150.0	Clear	Hydrogen sulfide - slight	8.61	0.809	0.23	2.82	12.1	-120.1	0.40	NA
02/24/11	11:50	11.45	150.0	Clear	Hydrogen sulfide - slight	8.58	0.810	0.22	2.66	12.0	-125.5	0.40	NA
02/24/11	11:55	11.45	150.0	Clear	Hydrogen sulfide - slight	8.57	0.808	0.22	2.09	12.1	-128.7	0.40	NA
02/24/11	12:00	11.45	150.0	Clear	Hydrogen sulfide - slight	8.58	0.806	0.22	2.76	12.0	-134.1	0.40	NA
02/24/11	12:06	11.45	150.0	Clear	Hydrogen sulfide - slight	8.58	0.805	0.22	2.96	12.1	-140.1	0.40	NA
02/24/11	12:10	11.45	150.0	Clear	Hydrogen sulfide - slight	8.57	0.808	0.24	2.35	11.9	-144.5	0.40	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:51	12:10	139	22.78	Clear	Hydrogen sulfide - slight	8.57	0.808	0.24	2.35	11.9	-144.5	0.40	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
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GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

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Sample ID: **DSY-GW-MW02A-022411** Sampler: Amy Carey
 Well ID: DSY-MW02A Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

✓	02/24/11	12:15	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-2
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General Notes

Pump intake depth of 21' below ground surface

Saturated screen volume:

$V = (0.163)(\text{Saturated Screen Interval in feet})(\text{Well Radius in inches}^2)$

$V = (0.163)(10)(1^2)$

$V = 1.63 \text{ Gallons (x 3.79 Liters/Gallon) = 6.18 Liters}$

Total of 3.69 screen volumes purged

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

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Sample ID: **DSY-GW-MW03-022411** Sampler: Amy Carey
 Well ID: DSY-MW03 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	7.25
Top of Screen (ft-BTOR)	5.79	H&S PID Monitor Reading (ppm)	N/A
Bottom of Screen (ft-BTOR)	15.79	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	17.00	Sample Method	Low flow - bladder pump

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/24/11	13:46	7.29	100.0	Clear	None	8.09	0.424	6.17	7.74	9.6	-5.5	0.21	NA
02/24/11	13:52	8.32	120.0	Clear	None	6.29	0.438	4.33	5.45	10.3	2.9	0.21	NA
02/24/11	13:57	7.35	275.0	Clear	None	5.81	0.433	4.17	4.33	11.4	8.3	0.21	NA
02/24/11	14:05	7.41	240.0	Clear	None	5.50	0.432	4.16	4.04	11.3	18.5	0.21	NA
02/24/11	14:15	7.43	240.0	Clear	None	5.53	0.439	4.09	2.80	11.4	23.4	0.21	NA
02/24/11	14:20	7.43	240.0	Clear	None	5.52	0.435	4.16	2.56	11.3	27.6	0.21	NA
02/24/11	14:25	7.43	240.0	Clear	None	5.51	0.437	4.10	3.01	11.3	30.5	0.21	NA
02/24/11	14:30	7.43	240.0	Clear	None	5.50	0.437	4.05	1.56	11.3	34.2	0.21	NA
02/24/11	14:35	7.43	240.0	Clear	None	5.50	0.434	4.13	2.23	11.3	37.0	0.21	NA
02/24/11	14:40	7.43	240.0	Clear	None	5.49	0.437	4.08	2.65	11.2	40.7	0.21	NA
02/24/11	14:45	7.43	240.0	Clear	None	5.49	0.435	4.13	2.64	11.3	42.6	0.21	NA
02/24/11	14:50	7.43	240.0	Clear	None	5.49	0.437	4.10	1.61	11.2	46.1	0.21	NA
02/24/11	14:56	7.43	240.0	Clear	None	5.49	0.436	4.12	2.56	11.3	48.6	0.21	NA
02/24/11	15:00	7.43	240.0	Clear	None	5.49	0.436	4.11	3.09	11.2	50.8	0.21	NA
02/24/11	15:05	7.43	240.0	Clear	None	5.49	0.435	4.10	2.38	11.2	52.4	0.21	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
13:46	15:05	79	18.415	Clear	None	5.49	0.435	4.10	2.38	11.2	52.4	0.21	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/24/11	15:10	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-2

General Notes

Pump intake 12'

Saturated screen volume:

$V = (0.163)(\text{Saturated Screen Interval in feet})(\text{Well Radius in inches}^2)$

$V = (0.163)(10)(1^2)$

$V = 1.63 \text{ Gallons (x 3.79 Liters/Gallon)} = 6.18 \text{ Liters}$

Total of 2.98 screen volumes purged

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-GW-MW08-030111** Sampler: Miki Alroy
 Well ID: DSY-MW08 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: MS/MSD

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	6.95
Top of Screen (ft-BTOR)	6.05	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	11.05	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	11.50	Sample Method	Low flow - bladder pump

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/01/11	10:27	6.95	100.0	Slightly Turbid	None	6.28	885	1.68	200	8.1	139.1	0.44	N/A
03/01/11	10:42	6.95	100.0	Slightly Turbid	None	6.45	886	1.39	200	7.7	116.9	0.44	N/A
03/01/11	10:47	7.04	100.0	Clear	None	6.40	885	0.65	76.3	7.9	102.9	0.44	N/A
03/01/11	10:52	6.95	100.0	Clear	None	6.32	892	0.48	37.3	8.1	102	0.44	N/A
03/01/11	10:57	7.06	100.0	Clear	None	6.30	894	0.45	22.6	8.1	101.5	0.44	N/A
03/01/11	11:02	7.07	100.0	Clear	None	6.30	895	0.41	16.3	8.1	100.0	0.44	N/A
03/01/11	11:07	7.07	100.0	Clear	None	6.29	896	0.39	10.98	8.1	99.6	0.44	N/A
03/01/11	11:12	7.07	100.0	Clear	None	6.29	896	0.38	7.44	8.2	94.3	0.44	N/A
03/01/11	11:17	7.09	100.0	Clear	None	6.30	896	0.40	6.79	8.2	92.1	0.44	N/A
03/01/11	11:22	7.1	100.0	Clear	None	6.30	894	0.43	4.06	8.2	92.3	0.44	N/A
03/01/11	11:27	7.11	100.0	Clear	None	6.30	895	0.43	3.75	8.2	92.7	0.44	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
10:27	11:27	60	6.0	Clear	None	6.30	895	0.43	3.75	8.2	92.7	0.44	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	03/01/11	11:35	VOCs	SW-846 8260B	4°C/HCL	9	Glass - Clear	40ml vials	Run MS/MSD	ED00000152-4
✓	03/01/11	11:35	PAHs	SW-846 8270C SIM	4°C	6	Glass - Amber	1L	Run MS/MSD	ED00000152-4
✓	03/01/11	11:35	Metals (Total)	SW-846 6010B	4°C/HNO3	2	Plastic - PE	250ml	Run MS/MSD	ED00000152-4
✓	03/01/11	11:35	Metals (Dissolved)	SW-846 6010B (Field-Filtered)	4°C/HNO3	2	Plastic - PE	250ml	Run MS/MSD	ED00000152-4

General Notes

 Saturated screen volume:
 $V = (0.163)(\text{Saturated Screen Interval in feet})(\text{Well Radius in inches}^2)$
 $V = (0.163)(5)(1^2)$
 $V = 0.815 \text{ Gallons (x 3.79 Liters/Gallon) = 3.09 Liters}$
 Total of 1.94 screen volumes purged

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 2

Sample ID: **DSY-GW-MW12-030311** Sampler: Amy Carey
 Well ID: DSY-MW12 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	8.22
Top of Screen (ft-BTOR)	15	H&S PID Monitor Reading (ppm)	7.3
Bottom of Screen (ft-BTOR)	25	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	25	Sample Method	bladder pump

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/03/11	11:50	8.30	150.0	Cloudy	None	7.78	0.620	1.83	29.6	10.5	252.1	0.30	NA
03/03/11	11:55	8.30	225.0	Slightly Turbid	None	7.76	0.622	0.80	20.9	10.9	248.8	0.30	NA
03/03/11	12:00	8.30	225.0	Clear	None	7.77	0.624	0.84	18.8	10.8	238.8	0.31	NA
03/03/11	12:05	8.30	225.0	Clear	None	7.83	0.625	0.65	16.4	11.2	22.7	0.31	NA
03/03/11	12:10	8.30	225.0	Clear	None	7.81	0.626	0.56	14.1	11.0	213.7	0.31	NA
03/03/11	12:15	8.30	225.0	Clear	None	7.87	0.627	0.46	12.9	10.9	205.8	0.31	NA
03/03/11	12:20	8.32	225.0	Clear	None	7.95	0.628	0.49	9.85	11.0	186.1	0.31	NA
03/03/11	12:25	8.32	225.0	Clear	None	7.92	0.627	0.33	8.14	11.4	165.5	0.31	NA
03/03/11	12:30	8.32	225.0	Clear	None	7.90	0.627	0.32	8.04	10.9	157.3	0.31	NA
03/03/11	12:35	8.32	225.0	Clear	None	7.93	0.627	0.60	6.08	11.2	148.6	0.31	NA
03/03/11	12:40	8.32	225.0	Clear	None	7.93	0.628	0.89	5.86	10.8	140.6	0.31	NA
03/03/11	12:45	8.32	225.0	Clear	None	7.95	0.627	0.81	5.50	11.0	129.8	0.31	NA
03/03/11	12:50	8.32	225.0	Clear	None	7.93	0.627	0.27	5.12	11.3	122.0	0.31	NA
03/03/11	12:55	8.32	225.0	Clear	None	7.91	0.627	0.26	4.11	11.2	109.4	0.31	NA
03/03/11	13:00	8.32	225.0	Clear	None	7.96	0.628	0.26	3.82	11.1	99.1	0.31	NA
03/03/11	13:05	8.32	225.0	Clear	None	7.96	0.628	0.23	4.38	11.4	90.6	0.31	NA
03/03/11	13:10	8.32	225.0	Clear	None	7.95	0.628	0.26	4.24	10.9	84.3	0.31	NA
03/03/11	13:15	8.33	225.0	Clear	None	7.95	0.628	0.24	6.50	11.0	72.4	0.31	NA
03/03/11	13:20	8.33	225.0	Clear	None	7.94	0.628	0.23	7.19	11.3	64.4	0.31	NA
03/03/11	13:25	8.34	225.0	Clear	None	7.96	0.629	0.23	6.34	11.0	53.7	0.31	NA
03/03/11	13:30	8.35	225.0	Clear	None	7.97	0.628	0.21	5.78	11.1	48.5	0.31	NA
03/03/11	13:35	8.35	225.0	Clear	None	7.96	0.628	0.61	6.01	11.0	41.7	0.31	NA
03/03/11	13:40	8.35	225.0	Clear	None	7.96	0.629	0.41	4.88	10.8	34.1	0.31	NA
03/03/11	13:45	8.35	225.0	Clear	None	7.96	0.628	0.31	4.72	11.1	26.2	0.31	NA
03/03/11	13:50	8.35	225.0	Clear	None	7.95	0.628	0.22	4.11	11.1	20.3	0.31	NA
03/03/11	13:55	8.35	225.0	Clear	None	7.96	0.628	0.21	3.21	11.0	10.3	0.31	NA
03/03/11	14:00	8.35	225.0	Clear	None	7.96	0.628	0.22	3.13	10.6	4.9	0.31	NA
03/03/11	14:05	8.35	225.0	Clear	None	7.97	0.628	0.21	3.54	10.8	-2.2	0.31	NA
03/03/11	14:10	8.35	225.0	Clear	None	7.96	0.628	0.21	3.39	10.7	-9.8	0.31	NA
03/03/11	14:15	8.35	225.0	Clear	None	7.96	0.628	0.21	4.13	10.8	-14.6	0.31	NA
03/03/11	14:20	8.35	225.0	Clear	None	7.96	0.628	0.27	3.09	10.9	-18.8	0.31	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11:50	14:20	150	33.75	Clear	None	7.96	0.628	0.27	3.09	10.9	-18.8	0.31	NA

Laboratory Analysis



GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
Project No: 112G02125.SA.DM (ED00000152)

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Sample ID: **DSY-GW-MW12-030311** Sampler: Amy Carey
Well ID: DSY-MW12 Well Type: Monitoring Well
QC Duplicate ID: N/A MS/MSD: N/A

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	03/03/11	14:26	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-6

General Notes

Amy Carey; pump intake 20' below ground. bladder pump

Saturated screen volume:

$V = (0.163)(\text{Saturated Screen Interval in feet})(\text{Well Radius in inches}^2)$

$V = (0.163)(10)(1^2)$

$V = 1.63 \text{ Gallons (x 3.79 Liters/Gallon)} = 6.18 \text{ Liters}$

Total of 5.46 screen volumes purged

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-GW-MW204-031711** Sampler: Robin Clark
 Well ID: DSY-MW204 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	10.60
Top of Screen (ft-BTOR)	8	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	18	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	18	Sample Method	Low Flow - Bladder

Equipment

Water Quality Meter:	Black	Pump Control Box:	N/A	Turbidity Meter:	None
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/17/11	9:16	10.60	130.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
03/17/11	9:26	10.61	130.0	Highly Turbid	None	6.00	484.0	2.58	700	10.3	197.0	NA	N/A
03/17/11	9:35	10.60	130.0	Cloudy	None	6.04	481.1	2.17	370	10.2	202.0	NA	N/A
03/17/11	9:40	10.60	130.0	Cloudy	None	6.00	481.3	2.15	290	10.2	203.5	NA	N/A
03/17/11	9:51	10.60	130.0	Cloudy	None	5.96	482.3	2.23	140	10.1	205.6	NA	N/A
03/17/11	9:59	10.60	130.0	Slightly Turbid	None	6.02	483.0	2.24	95	10.1	206.7	NA	N/A
03/17/11	10:11	10.60	130.0	Clear	None	6.05	484.6	2.37	60	10.4	206.8	NA	N/A
03/17/11	10:22	10.60	130.0	Clear	None	6.10	485.4	2.42	30	10.4	206.0	NA	N/A
03/17/11	10:32	10.60	130.0	Clear	None	6.11	485.9	2.54	16	10.3	205.1	NA	N/A
03/17/11	10:44	10.60	130.0	Clear	None	6.08	486.2	2.50	16	10.5	204.0	NA	N/A
03/17/11	10:48	10.60	130.0	Clear	None	6.08	487.0	2.47	15	10.5	203.7	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:16	10:48	92	11.96	Clear	None	6.08	487.0	2.47	15	10.5	203.7	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	03/17/11	10:49	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-7
✓	03/17/11	10:49	PAHs	SW-846 8270C SIM	4°C	2	Glass - Amber	1L	None	ED00000152-7
✓	03/17/11	10:49	Metals (Total)	SW-846 6010B	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-7
✓	03/17/11	10:49	Metals (Dissolved)	SW-846 6010B (Field-Filtered)	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-7

General Notes

Pump Intake @ 13 feet BGS

Unsaturated screen/well volume:
 $V = (0.163)(\text{Unsaturated Screen Interval in feet})(\text{Well Radius in inches}^2)$
 $V = (0.163)(7.40)(1^2)$
 $V = 1.21 \text{ Gallons (x 3.79 Liters/Gallon)} = 4.57 \text{ Liters}$
 Total of 2.62 water column volumes purged

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-GW-MW218-030111** Sampler: Amy Carey
 Well ID: DSY-MW218 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	14.91
Top of Screen (ft-BTOR)	10	H&S PID Monitor Reading (ppm)	3.4
Bottom of Screen (ft-BTOR)	20	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	20	Sample Method	bladder pump

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/01/11	12:57	14.94	275.0	Cloudy	None	7.46	0.833	2.85	84.4	9.6	80.8	0.40	NA
03/01/11	13:02	14.94	275.0	Slightly Turbid	None	6.61	0.819	0.86	68.7	9.8	72.4	0.41	NA
03/01/11	13:07	15.94	275.0	Slightly Turbid	None	6.61	0.827	0.65	46.5	9.9	64.3	0.41	NA
03/01/11	13:12	15.95	250.0	Clear	None	6.49	0.830	0.51	41.5	10.0	59.4	0.41	NA
03/01/11	13:17	14.95	250.0	Clear	None	6.48	0.826	0.36	39.5	9.9	53.3	0.41	NA
03/01/11	13:22	14.95	250.0	Clear	None	6.48	0.826	0.40	32.1	10.0	47.5	0.41	NA
03/01/11	13:27	14.95	250.0	Clear	None	6.46	0.832	0.60	29.3	10.2	40.2	0.41	NA
03/01/11	13:32	15.96	250.0	Clear	None	6.47	0.836	0.45	22.1	10.2	35.2	0.41	NA
03/01/11	13:37	14.96	250.0	Clear	None	6.48	0.841	0.53	18.1	10.2	29.1	0.41	NA
03/01/11	13:42	14.97	250.0	Clear	None	6.49	0.849	0.36	12.8	10.3	22.7	0.42	NA
03/01/11	13:47	14.97	250.0	Clear	None	6.47	0.854	0.24	13.8	10.2	17.0	0.42	NA
03/01/11	13:52	14.98	250.0	Clear	None	6.47	0.856	0.25	13.6	10.2	12.1	0.42	NA
03/01/11	13:57	14.99	250.0	Clear	None	6.48	0.864	0.27	13.0	10.2	7.7	0.43	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
12:57	13:57	60	15.25	Clear	None	6.48	0.864	0.27	13.0	10.2	7.7	0.43	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	03/01/11	14:00	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-4
✓	03/01/11	14:00	PAHs	SW-846 8270C SIM	4°C	2	Glass - Amber	1L	None	ED00000152-4
✓	03/01/11	14:00	Metals (Total)	SW-846 6010B	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-4
✓	03/01/11	14:00	Metals (Dissolved)	SW-846 6010B (Field-Filtered)	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-4

General Notes

Pump intake 15' below ground; bladder pump

Unsaturated screen/well volume:

$V = (0.163)(\text{Unsaturated Screen Interval in feet})(\text{Well Radius in inches}^2)$

$V = (0.163)(5.09)(1^2)$

$V = 0.83 \text{ Gallons (x 3.79 Liters/Gallon)} = 3.14 \text{ Liters}$

Total of 4.85 water column volumes purged

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-GW-MW219-031611** Sampler: Robin Clark
 Well ID: DSY-MW219 Well Type: Monitoring Well
 QC Duplicate ID: DSY-GW-DUP02-031611 MS/MSD: N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	14.76
Top of Screen (ft-BTOR)	10	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	20	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	20	Sample Method	bladder

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/16/11	8:52	14.76	200.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
03/16/11	9:02	14.90	159.0	Highly Turbid	None	7.07	680.3	0.76	9999	8.7	-68.0	NA	N/A
03/16/11	9:09	14.92	130.0	Highly Turbid	None	6.89	678.0	0.69	9999	8.7	-76.5	NA	N/A
03/16/11	9:17	14.92	130.0	Highly Turbid	None	6.90	683.5	0.43	950	8.7	-83.6	NA	N/A
03/16/11	9:30	14.94	130.0	Cloudy	None	6.94	693.3	0.38	230	8.7	-94.8	NA	N/A
03/16/11	9:46	14.94	130.0	Slightly Turbid	None	6.97	707.0	0.24	45	8.7	-105.7	NA	N/A
03/16/11	10:00	14.94	130.0	Clear	None	6.99	707.7	0.25	18	8.7	-108.5	NA	N/A
03/16/11	10:05	14.94	130.0	Clear	None	7.00	707.6	0.29	17	8.7	-109.3	NA	N/A
03/16/11	10:10	14.94	130.0	Clear	None	7.00	706.9	0.21	15	8.6	-109.4	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
8:52	10:10	78	10.43	Clear	None	7.00	706.9	0.21	15	8.6	-109.4	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	03/16/11	10:12	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-7
✓	03/16/11	10:12	PAHs	SW-846 8270C SIM	4°C	2	Glass - Amber	1L	None	ED00000152-7
✓	03/16/11	10:12	Metals (Total)	SW-846 6010B	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-7
✓	03/16/11	10:12	Metals (Dissolved)	SW-846 6010B (Field-Filtered)	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000152-7

General Notes

pump intake at 15 ft bgs.

Unsaturated screen/well volume:

$V = (0.163)(\text{Unsaturated Screen Interval in feet})(\text{Well Radius in inches}^2)$

$V = (0.163)(5.24)(1^2)$

$V = 0.85 \text{ Gallons (x 3.79 Liters/Gallon)} = 3.24 \text{ Liters}$

Total of 3.22 water column volumes purged

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-GW-MW220-030111** Sampler: Amy Carey
 Well ID: DSY-MW220 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	8.37
Top of Screen (ft-BTOR)	5	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	20	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	20	Sample Method	bladder

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/01/11	10:15	8.41	175.0	Cloudy	None	6.45	6.089	2.09	169	8.0	244.5	3.32	NA
03/01/11	10:25	8.42	150.0	Cloudy	None	6.90	6.076	1.12	149	8.2	176.0	3.30	NA
03/01/11	10:30	8.41	175.0	Slightly Turbid	None	7.02	6.067	0.88	73.6	8.7	135.2	3.31	NA
03/01/11	10:35	8.41	200.0	Slightly Turbid	None	7.10	6.063	0.64	42.6	8.8	104.0	3.30	NA
03/01/11	10:40	8.42	200.0	Slightly Turbid	None	7.16	5.999	0.90	28.9	8.8	71.4	3.27	NA
03/01/11	10:45	8.43	200.0	Slightly Turbid	None	7.15	5.928	0.82	22.5	9.0	47.0	3.22	NA
03/01/11	10:50	8.43	200.0	Slightly Turbid	None	7.18	5.929	0.62	18.2	8.9	35.7	3.22	NA
03/01/11	10:55	8.43	200.0	Clear	None	7.22	5.896	0.63	16.8	9.0	11.1	3.19	NA
03/01/11	11:00	8.43	200.0	Clear	None	7.22	5.852	0.56	13.5	9.0	-2.9	3.18	NA
03/01/11	11:05	8.43	200.0	Clear	None	7.22	5.791	0.48	11.1	8.9	-33.6	3.14	NA
03/01/11	11:10	8.43	200.0	Clear	None	7.24	5.765	0.51	10.11	8.9	-41.6	3.13	NA
03/01/11	11:15	8.44	200.0	Clear	None	7.24	5.709	1.01	8.05	9.0	-61.9	3.10	NA
03/01/11	11:20	8.45	200.0	Clear	None	7.25	5.718	0.37	6.59	9.0	-66.2	3.10	NA
03/01/11	11:25	8.45	200.0	Clear	None	7.26	5.685	0.95	5.83	9.0	-72.6	3.09	NA
03/01/11	11:30	8.45	200.0	Clear	None	7.25	5.687	1.11	4.84	9.0	-80.1	3.09	NA
03/01/11	11:35	8.46	200.0	Clear	None	7.25	5.675	0.97	3.29	9.0	-84.5	3.08	NA
03/01/11	11:40	8.46	200.0	Clear	None	7.26	5.651	0.98	3.15	9.1	-88.9	3.07	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
10:15	11:40	85	16.375	Clear	None	7.26	5.651	0.98	3.15	9.1	-88.9	3.07	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	03/01/11	11:45	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-4

General Notes

Pump intake 12.5' below ground surface; bladder pump; purged ~5 gallons

Unsaturated screen/well volume:

$V = (0.163)(\text{Unsaturated Screen Interval in feet})(\text{Well Radius in inches}^2)$

$V = (0.163)(11.63)(1^2)$

$V = 1.90 \text{ Gallons (x 3.79 Liters/Gallon)} = 7.18 \text{ Liters}$

Total of 2.28 water column volumes purged

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID:	DSY-GW-MW221-030211	Sampler:	Amy Carey
Well ID:	DSY-MW221	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	7.09
Top of Screen (ft-BTOR)	3	H&S PID Monitor Reading (ppm)	0.4
Bottom of Screen (ft-BTOR)	15	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	15	Sample Method	bladder pump

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/02/11	12:49	7.11	300.0	Slightly Turbid	None	7.23	0.639	1.88	24.5	9.6	155.1	0.31	NA
03/02/11	12:54	7.11	300.0	Slightly Turbid	None	6.53	0.631	1.31	21.2	9.7	153.4	0.31	NA
03/02/11	12:59	7.14	225.0	Clear	None	6.11	0.650	1.14	11.8	9.6	153.7	0.32	NA
03/02/11	13:04	7.14	225.0	Clear	None	6.01	0.656	1.11	7.95	9.6	153.5	0.32	NA
03/02/11	13:09	7.15	225.0	Clear	None	5.97	0.642	1.01	4.82	9.6	153.3	0.32	NA
03/02/11	13:14	7.15	200.0	Clear	None	5.93	0.636	0.95	3.34	9.7	152.1	0.31	NA
03/02/11	13:19	7.15	200.0	Clear	None	5.92	0.620	0.93	3.01	9.8	150.7	0.30	NA
03/02/11	13:24	7.15	200.0	Clear	None	5.92	0.606	0.86	1.66	9.7	148.6	0.30	NA
03/02/11	13:29	7.15	200.0	Clear	None	5.91	0.602	0.85	0.86	9.5	146.9	0.29	NA
03/02/11	13:34	7.15	200.0	Clear	None	5.90	0.594	0.84	0.86	9.6	144.9	0.29	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
12:49	13:34	45	9.875	Clear	None	5.90	0.594	0.84	0.86	9.6	144.9	0.29	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	03/02/11	13:40	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-4

General Notes

Pump intake at 9' below ground surface; bladder pump

Unsaturated screen/well volume:

$$V = (0.163)(\text{Unsaturated Screen Interval in feet})(\text{Well Radius in inches}^2)$$
$$V = (0.163)(7.91)(1^2)$$
$$V = 1.29 \text{ Gallons (x 3.79 Liters/Gallon)} = 4.89 \text{ Liters}$$

Total of 2.02 water column volumes purged

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-GW-MW222-030211** Sampler: Amy Carey
 Well ID: DSY-MW222 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	5.09
Top of Screen (ft-BTOR)	4	H&S PID Monitor Reading (ppm)	1.0
Bottom of Screen (ft-BTOR)	14	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	14	Sample Method	bladder pump

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/02/11	10:12	5.09	300.0	Cloudy	None	7.28	1.123	6.65	224	8.1	222.9	0.56	NA
03/02/11	10:17	5.10	300.0	Cloudy	None	7.29	1.133	6.42	185	7.8	207.6	0.57	NA
03/02/11	10:22	5.11	300.0	Cloudy	None	7.30	1.164	6.34	147	7.6	189.5	0.58	NA
03/02/11	10:27	5.11	300.0	Cloudy	None	7.32	1.152	6.35	137	7.5	180.7	0.57	NA
03/02/11	10:32	5.11	300.0	Cloudy	None	7.35	1.100	6.44	58.4	7.3	174.2	0.54	NA
03/02/11	10:37	5.11	300.0	Clear	None	7.36	1.056	0.52	37.5	7.1	169.5	0.52	NA
03/02/11	10:42	5.11	300.0	Slightly Turbid	None	7.36	1.044	6.49	25.1	7.1	163.0	0.52	NA
03/02/11	10:47	5.11	300.0	Slightly Turbid	None	7.36	1.039	6.37	21.5	7.1	159.2	0.52	NA
03/02/11	10:52	5.11	300.0	Clear	None	7.39	1.049	6.33	22.9	7.0	154.0	0.52	NA
03/02/11	10:57	5.110	250.0	Clear	None	7.33	1.056	6.28	14.0	7.0	148.9	0.53	NA
03/02/11	11:02	5.10	250.0	Clear	None	7.37	1.056	6.46	14.3	7.1	143.4	0.53	NA
03/02/11	11:07	5.10	250.0	Clear	None	7.35	1.061	6.41	15.0	7.1	139.0	0.53	NA
03/02/11	11:12	5.10	250.0	Clear	None	7.39	1.057	6.40	14.2	7.1	133.9	0.52	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
10:12	11:12	60	17.0	Clear	None	7.39	1.057	6.40	14.2	7.1	133.9	0.52	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	03/02/11	11:15	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-4

General Notes

Pump intake depth 9' below ground surface; bladder pump

Unsaturated screen/well volume:

$V = (0.163)(\text{Unsaturated Screen Interval in feet})(\text{Well Radius in inches}^2)$

$V = (0.163)(8.91)(1^2)$

$V = 1.45 \text{ Gallons (x 3.79 Liters/Gallon)} = 5.05 \text{ Liters}$

Total of 3.09 water column volumes purged

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-GW-MW223-031611** Sampler: Robin Clark
 Well ID: DSY-MW223 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	11.98
Top of Screen (ft-BTOR)	41	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	51	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	51	Sample Method	bladder pump

Equipment

Water Quality Meter:	black	Pump Control Box:	N/A	Turbidity Meter:	45313303
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/15/11	14:46	11.98	100.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
03/15/11	14:51	11.98	100.0	Highly Turbid	None	7.31	346.1	0.94	9999	12.8	-48.4	NA	N/A
03/15/11	15:03	11.98	100.0	Highly Turbid	None	6.73	338.8	0.50	950	12.6	-64.5	NA	N/A
03/15/11	15:12	11.98	100.0	Highly Turbid	None	6.70	338.0	0.42	750	12.6	-66.9	NA	N/A
03/15/11	15:28	11.98	100.0	Highly Turbid	None	na	NA	NA	NA	NA	NA	NA	N/A
03/16/11	12:08	11.96	100.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
03/16/11	12:20	11.98	100.0	Cloudy	None	6.87	324.3	1.25	400	11.8	-23.8	NA	N/A
03/16/11	12:30	11.98	100.0	Cloudy	None	6.82	323.9	0.50	250	12.1	-32.5	NA	N/A
03/16/11	12:49	11.98	100.0	Slightly Turbid	None	6.80	323.5	0.40	170	12.1	-40.2	NA	N/A
03/16/11	12:59	11.98	100.0	Slightly Turbid	None	6.81	326.0	0.45	110	12.2	-45.0	NA	N/A
03/16/11	13:10	11.98	100.0	Slightly Turbid	None	6.80	322.1	0.31	60	12.3	-44.3	NA	N/A
03/16/11	13:19	11.98	100.0	Slightly Turbid	None	6.81	324.3	0.32	65	12.3	-48.4	NA	N/A
03/16/11	13:29	11.98	100.0	Clear	None	6.80	323.6	0.36	55	12.3	-49.4	NA	N/A
03/16/11	13:34	11.98	100.0	Clear	None	6.81	327.0	0.30	55	12.2	-52.5	NA	N/A
03/16/11	13:38	11.98	100.0	Clear	None	6.81	326.1	0.29	50	12.1	-52.7	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
12:08	15:28	200	20.0	Clear	None	6.81	326.1	0.29	50	12.1	-52.7	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	03/16/11	13:40	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000152-7

General Notes

3/16/11 12:00 WATER LEVEL 11.96

Saturated screen volume:

$V = (0.163)(\text{Saturated Screen Interval in feet})(\text{Well Radius in inches}^2)$

$V = (0.163)(10)(1^2)$

$V = 1.63 \text{ Gallons (x 3.79 Liters/Gallon)} = 6.18 \text{ Liters}$

Total of 3.24 screen volumes purged

A-3 SOIL GAS LOG SHEETS

SOIL GAS SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DSY-SG-MW02A-0708**

Lead Sampler: Miki Alroy

Location ID: DSY-SG02A

Additional Sampler(s) Johanna Traut

QC Duplicate ID: N/A

MS/MSD: NA

Sample Data

Sampling Source	Soil Gas-SG	Sampling Type	Sub-slab
Top Depth of Probe (ft-bgs)	7	Type of Probe	PRT
Bottom Depth of Probe(ft-bgs)	8	Diameter of Probe (in)	1.50

Equipment

Gauge	Yes	Gauge Serial Number	22509
Sample Canister	Yes	Sample Canister Serial Number	22509
Sample Canister Model Number	74375A	Sample Canister Leak Check Date	02/24/11

Leak Test

Leak Test Start Date	02/24/2011	Leak Test Start Time	09:45
Leak Test End Date	02/24/2011	Leak Test End Time	10:00
Leak Test Duration (min)	14	Leak Test Volume (L)	3.5
Leak Flow Rate (mL/min)	250.00	Results of Leak Test (ppm-He)	5000

Sample Purge Information

Date	Time	PID Reading (ppm)	Pressure (in-Hg)	Method	Temp (°C)	Other	Notes
02/24/11	11:05	NA	-26	Low-flow air pump w/Helium leak test	NA	N/A	None
02/24/11	11:10	NA	-23	Low-flow air pump w/Helium leak test	NA	N/A	None
02/24/11	11:15	NA	-19	Low-flow air pump w/Helium leak test	NA	N/A	None
02/24/11	11:20	NA	-15	Low-flow air pump w/Helium leak test	NA	N/A	None
02/24/11	11:25	NA	-11.5	Low-flow air pump w/Helium leak test	NA	N/A	None
02/24/11	11:30	NA	-9.5	Low-flow air pump w/Helium leak test	NA	N/A	None
02/24/11	11:45	NA	-7	Low-flow air pump w/Helium leak test	NA	N/A	None
02/24/11	11:55	NA	-2	Low-flow air pump w/Helium leak test	NA	N/A	checked with standard regulator- flow regulator stopped dropping -standard regulator read -2 in Hg.

Final Purge / Sample Data

Start Sample Collection (hrs)	End Sample Collection (hrs)	Sample Collection Duration (min)	Sample Collection Volume (L)	Sample Collection Flow Rate (mL/min)	Method	PID Reading (ppm)	Pressure (in Hg)	Temp (°C)	Other
11:05	11:45	40.0	N/A	0.0	N/A	N/A	N/A	N/A	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	02/24/11	11:05	VOCs	TO-15	None	1	SUMMA Canister	6 L	None	ED00000152-5

General Notes

Allowed 1 hour equilibration time after leak test.
 PID reading during leak test: 1.1 ppm

SOIL GAS SAMPLE LOG SHEET

A-4 CHAINS OF CUSTODY RECORDS

Project No: 112G02125	Facility: Newport NS	Project Manager: Thomas Campbell	Carrier: Federal Express	Laboratory Name: Empirical Laboratories, LLC 621 Mainstream Drive Nashville, TN 37228
Task No: WE20	Turn Around Time: Standard	Field Ops Leader: Miki Alroy	Carrier/Waybill No. TBD	Point of Contact: Kim Kostzer 615.345.1115 ext. 240

[illegible]

02/14/2011	DSY-SB206-SO-0810	14:55	SW-846 8015B	DSY-SB206	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/14/2011	DSY-SB206-SO-0810	14:55	SW-846 6010B	DSY-SB206	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SB206-SO-0810	14:55	SW-846 8015B.	DSY-SB206	SO	DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SO-DUP01-021411	00:00	SW-846 8270C/8015B	QC	SO	PAHs/DRO	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	2 jars for each PAHs and DRO
02/14/2011	DSY-SO-DUP01-021411	00:00	SW-846 8260B	QC	SO	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/14/2011	DSY-SO-DUP01-021411	00:00	Percent Moisture	QC	SO	Percent Moisture for VOCs	None	1	Plastic - PE	4 oz. wide-mouth w/Teflon cap	
02/14/2011	DSY-SO-DUP01-021411	00:00	SW-846 8015B	QC	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/14/2011	DSY-SO-DUP01-021411	00:00	SW-846 6010B	QC	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB205-SO-0002	12:10	SW-846 8260B	DSY-SB205	SO	VOCs	4°C/MeOH+DI Combo	9	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011	DSY-SB205-SO-0002	12:10	Percent Moisture	DSY-SB205	SO	Percent Moisture for VOCs	None	3	Glass - Clear	2 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB205-SO-0002	12:10	SW-846 8015B.	DSY-SB205	SO	DRO	4°C	3	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB205-SO-0002	12:10	SW-846 6010B	DSY-SB205	SO	Metals	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB205-SO-0002	12:10	SW-846 8015B	DSY-SB205	SO	GRO	4°C/MeOH	3	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011	DSY-SB205-SO-0002	12:15	SW-846 8270C	DSY-SB205	SO	PAHs	4°C	3	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB205-SO-088.5	12:30	SW-846 8260B	DSY-SB205	SO	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011	DSY-SB205-SO-088.5	12:30	Percent Moisture	DSY-SB205	SO	Percent Moisture for VOCs	None	1	Glass - Clear	2 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB205-SO-088.5	12:30	SW-846 8270C	DSY-SB205	SO	PAHs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB205-SO-088.5	12:30	SW-846 6010B	DSY-SB205	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB205-SO-088.5	12:30	SW-846 8015B	DSY-SB205	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011	DSY-SB205-SO-088.5	12:30	SW-846 8015B.	DSY-SB205	SO	DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB207-SO-0002	09:05	SW-846 8260B	DSY-SB207	SO	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011	DSY-SB207-SO-0002	09:05	Percent Moisture	DSY-SB207	SO	Percent Moisture for VOCs	None	1	Glass - Clear	2 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB207-SO-0002	09:05	SW-846 8270C	DSY-SB207	SO	PAHs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB207-SO-0002	09:05	SW-846 6010B	DSY-SB207	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB207-SO-0002	09:05	SW-846 8015B	DSY-SB207	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011	DSY-SB207-SO-0002	09:05	SW-846 8015B.	DSY-SB207	SO	DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB207-SO-1012	09:35	SW-846 8260B	DSY-SB207	SO	VOCs	4°C/MeOH+DI Combo	3	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011	DSY-SB207-SO-1012	09:35	Percent Moisture	DSY-SB207	SO	Percent Moisture for VOCs	None	1	Glass - Clear	2 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB207-SO-1012	09:35	SW-846 8270C	DSY-SB207	SO	PAHs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB207-SO-1012	09:35	SW-846 6010B	DSY-SB207	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/15/2011	DSY-SB207-SO-1012	09:35	SW-846 8015B	DSY-SB207	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/15/2011	DSY-SB207-SO-1012	09:35	SW-846 8015B.	DSY-SB207	SO	DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	

1. Relinquished By: Miki Alroy	Date: 02/15/2011	Time: 16:27	Received By: Federal Express	Date: 02/15/2011	Time: 17:27
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Comments:					



TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: ED00000152-2

Project No: 112G02125	Facility: Newport NS	Project Manager: Thomas Campbell	Carrier: Federal Express	Laboratory Name: Empirical Laboratories, LLC 621 Mainstream Drive Nashville, TN 37228
Task No: WE20	Turn Around Time: Standard	Field Ops Leader: Miki Alroy	Carrier/Waybill No.	Point of Contact: Kim Kostzer 615.345.1115 ext. 240

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
02/24/2011	DSY-GW-MW02A-022411	12:15	SW-846 8260B	DSY-MW02A	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
02/24/2011	DSY-GW-MW03-022411	15:10	SW-846 8260B	DSY-MW03	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
02/24/2011	DSY-GW-TB01-022411	08:00	SW-846 8260B	QC	AQ	VOCs	4°C/HCL	2	Glass - Clear	40ml vials	

1. Relinquished By: Miki Alroy	Date: 02/25/2011	Time: 18:30	Received By: Federal Express	Date: 02/25/2011	Time: 18:30
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments:



TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: ED00000152-3

Project No: 112G02125	Facility: Newport NS	Project Manager: Thomas Campbell	Carrier: Federal Express	Laboratory Name: Empirical Laboratories, LLC 621 Mainstream Drive Nashville, TN 37228
Task No: WE20	Turn Around Time: Standard	Field Ops Leader: Miki Alroy	Carrier/Waybill No.	Point of Contact: Kim Kostzer 615.345.1115 ext. 240

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
02/22/2011	DSY-SO-DUP01-022211	00:00	SW-846 8082	QC	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/22/2011	DSY-SO-SB215-000.5	15:00	SW-846 8082	DSY-SB215	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/22/2011	DSY-SO-SB216-000.5	15:35	SW-846 8082	DSY-SB216	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/22/2011	DSY-SO-SB217-000.5	15:40	SW-846 8082	DSY-SB217	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/22/2011	DSY-SO-SB224-000.5	16:05	SW-846 8082	DSY-SB224	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-DUP02-0211	00:00	SW-846 8082	QC	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-DUP02-0211	00:00	Percent Moisture.	QC	SO	Percent Moisture for GRO	4°C	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-DUP02-0211	00:00	SW-846 8015B	QC	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011	DSY-SO-DUP02-0211	00:00	SW-846 8270C/8015B	QC	SO	PAHs/DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-DUP02-0211	00:00	SW-846 6010B	QC	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB208-000.5	14:05	SW-846 8270C/8015B	DSY-SB208	SO	PAHs/DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB208-000.5	14:05	SW-846 8082	DSY-SB208	SO	PCBs	4°C	3	Glass - Amber	4 oz. wide-mouth w/Teflon cap	Run MS/MSD
02/25/2011	DSY-SO-SB208-000.5	14:05	SW-846 6010B	DSY-SB208	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB208-000.5	14:05	Percent Moisture.	DSY-SB208	SO	Percent Moisture for GRO	4°C	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB208-000.5	14:05	SW-846 8015B	DSY-SB208	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011	DSY-SO-SB209-0.30.7	10:05	SW-846 8082	DSY-SB209	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB209-0.30.7	10:05	SW-846 8270C/8015B	DSY-SB209	SO	PAHs/DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB209-0.30.7	10:05	SW-846 6010B	DSY-SB209	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB209-0.30.7	10:05	Percent Moisture.	DSY-SB209	SO	Percent Moisture for GRO	4°C	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB209-0.30.7	10:05	SW-846 8015B	DSY-SB209	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011	DSY-SO-SB210-0102	12:35	SW-846 8270C/8015B	DSY-SB210	SO	PAHs/DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB210-0102	12:35	SW-846 8082	DSY-SB210	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB210-0102	12:35	SW-846 6010B	DSY-SB210	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB210-0102	12:35	Percent Moisture.	DSY-SB210	SO	Percent Moisture for GRO	4°C	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB210-0102	12:35	SW-846 8015B	DSY-SB210	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011	DSY-SO-SB211-0102	13:35	SW-846 8270C/8015B	DSY-SB211	SO	PAHs/DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB211-0102	13:35	SW-846 8082	DSY-SB211	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB211-0102	13:35	SW-846 6010B	DSY-SB211	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB211-0102	13:35	Percent Moisture.	DSY-SB211	SO	Percent Moisture for GRO	4°C	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	

02/25/2011	DSY-SO-SB211-0102	13:35	SW-846 8015B	DSY-SB211	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011	DSY-SO-SB212-0204	15:00	Percent Moisture.	DSY-SB212	SO	Percent Moisture for GRO	4°C	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB212-0204	15:00	SW-846 8082	DSY-SB212	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB212-0204	15:00	SW-846 6010B	DSY-SB212	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB212-0204	15:00	SW-846 8015B	DSY-SB212	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011	DSY-SO-SB212-0204	15:00	SW-846 8270C/8015B	DSY-SB212	SO	PAHs/DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB213-0203	13:25	SW-846 8270C/8015B	DSY-SB213	SO	PAHs/DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB213-0203	13:25	SW-846 8082	DSY-SB213	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB213-0203	13:25	SW-846 6010B	DSY-SB213	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB213-0203	13:25	Percent Moisture.	DSY-SB213	SO	Percent Moisture for GRO	4°C	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB213-0203	13:25	SW-846 8015B	DSY-SB213	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011	DSY-SO-SB214-0203	13:40	SW-846 8270C/8015B	DSY-SB214	SO	PAHs/DRO	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB214-0203	13:40	SW-846 8082	DSY-SB214	SO	PCBs	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB214-0203	13:40	SW-846 6010B	DSY-SB214	SO	Metals	4°C	1	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB214-0203	13:40	Percent Moisture.	DSY-SB214	SO	Percent Moisture for GRO	4°C	1	Plastic - PE	2 oz. wide-mouth w/Teflon cap	
02/25/2011	DSY-SO-SB214-0203	13:40	SW-846 8015B	DSY-SB214	SO	GRO	4°C/MeOH	1	Glass - Clear	40 mL vial (pre-tared)	
02/25/2011	DSY-SO-TB02-022511	08:00	SW-846 8015B	QC	AQ	GRO	4°C/MeOH	2	Glass - Clear	40ml vials	Trip blank for soils

1. Relinquished By: Miki Alroy	Date: 02/25/2011	Time: 18:30	Received By: Federal Express	Date: 02/25/2011	Time: 18:30
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments:



TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: ED00000152-4

Project No: 112G02125	Facility: Newport NS	Project Manager: Thomas Campbell	Carrier: Federal Express	Laboratory Name: Empirical Laboratories, LLC 621 Mainstream Drive Nashville, TN 37228
Task No: WE20	Turn Around Time: Standard	Field Ops Leader: Miki Alroy	Carrier/Waybill No.	Point of Contact: Kim Kostzer 615.345.1115 ext. 240

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
02/26/2011	DSY-GW-DUP01-0211	00:00	SW-846 8260B	QC	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
02/26/2011	DSY-GW-MW11A-022611	13:10	SW-846 8260B	DSY-MW11A	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
02/26/2011	DSY-GW-TB01-030111	08:00	SW-846 8260B	QC	AQ	VOCs	4°C/HCL	2	Glass - Clear	40ml vials	
03/01/2011	DSY-GW-MW08-030111	11:35	SW-846 8260B	DSY-MW08	GW	VOCs	4°C/HCL	9	Glass - Clear	40ml vials	Run MS/MSD
03/01/2011	DSY-GW-MW08-030111	11:35	SW-846 8270C SIM	DSY-MW08	GW	PAHs	4°C	6	Glass - Amber	1L	Run MS/MSD
03/01/2011	DSY-GW-MW08-030111	11:35	SW-846 6010B	DSY-MW08	GW	Metals (Total)	4°C/HNO3	2	Plastic - PE	250ml	Run MS/MSD
03/01/2011	DSY-GW-MW08-030111	11:35	SW-846 6010B (Field-Filtered)	DSY-MW08	GW	Metals (Dissolved)	4°C/HNO3	2	Plastic - PE	250ml	Run MS/MSD
03/01/2011	DSY-GW-MW218-030111	14:00	SW-846 8260B	DSY-MW218	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/01/2011	DSY-GW-MW218-030111	14:00	SW-846 8270C SIM	DSY-MW218	GW	PAHs	4°C	2	Glass - Amber	1L	
03/01/2011	DSY-GW-MW218-030111	14:00	SW-846 6010B	DSY-MW218	GW	Metals (Total)	4°C/HNO3	1	Plastic - PE	250ml	
03/01/2011	DSY-GW-MW218-030111	14:00	SW-846 6010B (Field-Filtered)	DSY-MW218	GW	Metals (Dissolved)	4°C/HNO3	1	Plastic - PE	250ml	
03/01/2011	DSY-GW-MW220-030111	11:45	SW-846 8260B	DSY-MW220	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/02/2011	DSY-GW-MW221-030211	13:40	SW-846 8260B	DSY-MW221	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/02/2011	DSY-GW-MW222-030211	11:15	SW-846 8260B	DSY-MW222	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	

1. Relinquished By: Miki Alroy	Date: 03/02/2011	Time: 16:00	Received By: Federal Express	Date: 03/02/2011	Time: 16:00
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments:



TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: ED00000152-5

Project No: 112G02125	Facility: Newport NS	Project Manager: Thomas Campbell	Carrier: Federal Express	Laboratory Name: Air Toxics Ltd. 180 Blue Ravine Rd. Folsom, CA 95630
Task No: WE20	Turn Around Time: Standard	Field Ops Leader: Miki Alroy	Carrier/Waybill No. TBD	Point of Contact: Ausha Scott 916-605-3344 (Direct Line/Fax)

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
02/24/2011	DSY-SG-DUP01-0211	00:00	TO-15	QC	SG	VOCs	None	1	SUMMA Canister	6 L	
02/24/2011	DSY-SG-MW02A-0708	11:05	TO-15	DSY-SG02A	SG	VOCs	None	1	SUMMA Canister	6 L	
02/24/2011	DSY-SG-MW03-0608	15:30	TO-15	DSY-SG03	SG	VOCs	None	1	SUMMA Canister	6 L	
03/03/2011	DSY-SG-MW11A-0203	12:20	TO-15	DSY-SG11A	SG	VOCs	None	1	SUMMA Canister	6 L	
03/03/2011	DSY-SG-MW12-0506	15:19	TO-15	DSY-SG12	SG	VOCs	None	1	SUMMA Canister	6 L	

1. Relinquished By: Miki Alroy	Date: 03/09/2011	Time: 16:00	Received By: Federal Express	Date: 03/09/2011	Time: 16:00
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Comments:					



TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: ED00000152-6

Project No: 112G02125	Facility: Newport NS	Project Manager: Thomas Campbell	Carrier: Federal Express	Laboratory Name: Empirical Laboratories, LLC 621 Mainstream Drive Nashville, TN 37228
Task No: WE20	Turn Around Time: Standard	Field Ops Leader: Miki Alroy	Carrier/Waybill No. TBD	Point of Contact: Kim Kostzer 615.345.1115 ext. 240

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
03/03/2011	DSY-GW-MW12-030311	14:26	SW-846 8260B	DSY-MW12	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 8270C SIM	QC	AQ	PAHs	4°C	2	Glass - Amber	1L	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 8260B	QC	AQ	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 6010B	QC	AQ	Metals (Total)	4°C/HNO3	1	Plastic - PE	250ml	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 8082	QC	AQ	PCBs	4°C	2	Glass - Amber	1L	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 8015B	QC	AQ	GRO	4°C/HCL	3	Glass - Clear	40ml vials	
03/08/2011	DSY-SO-RB01-0311	15:00	SW-846 8015B	QC	AQ	DRO	4°C/HCL	2	Glass - Amber	1L	
03/08/2011	DYS-GW-TB01-030311	08:00	SW-846 8260B	QC	AQ	VOCs	4°C/HCL	1	Glass - Clear	40ml vials	
03/08/2011	DYS-GW-TB01-030311	08:00	SW-846 8015B	QC	AQ	GRO	4°C/HCL	1	Glass - Clear	40ml vials	

1. Relinquished By: Miki Alroy	Date: 03/09/2011	Time: 16:00	Received By: Federal Express	Date: 03/09/2011	Time: 16:00
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Comments:					



TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: ED00000152-7

Project No: 112G02125	Facility: Newport NS	Project Manager: Thomas Campbell	Carrier: Federal Express	Laboratory Name: Empirical Laboratories, LLC 621 Mainstream Drive Nashville, TN 37228
Task No: WE20	Turn Around Time: Standard	Field Ops Leader: Miki Alroy	Carrier/Waybill No.	Point of Contact: Kim Kostzer 615.345.1115 ext. 240

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
03/16/2011	DSY-GW-DUP02-031611	00:00	SW-846 8260B	QC	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/16/2011	DSY-GW-DUP02-031611	00:00	SW-846 6010B (Field-Filtered)	QC	GW	Metals (Dissolved)	4° C/HNO3	1	Plastic - PE	250ml	
03/16/2011	DSY-GW-DUP02-031611	00:00	SW-846 8270C SIM	QC	GW	PAHs	4°C	2	Glass - Amber	1L	
03/16/2011	DSY-GW-DUP02-031611	00:00	SW-846 6010B	QC	GW	Metals (Total)	4° C/HNO3	1	Plastic - PE	250ml	
03/16/2011	DSY-GW-MW219-031611	10:12	SW-846 8260B	DSY-MW219	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/16/2011	DSY-GW-MW219-031611	10:12	SW-846 8270C SIM	DSY-MW219	GW	PAHs	4°C	2	Glass - Amber	1L	
03/16/2011	DSY-GW-MW219-031611	10:12	SW-846 6010B	DSY-MW219	GW	Metals (Total)	4° C/HNO3	1	Plastic - PE	250ml	
03/16/2011	DSY-GW-MW219-031611	10:12	SW-846 6010B (Field-Filtered)	DSY-MW219	GW	Metals (Dissolved)	4° C/HNO3	1	Plastic - PE	250ml	
03/16/2011	DSY-GW-MW223-031611	13:40	SW-846 8260B	DSY-MW223	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/16/2011	DSY-GW-RB01-031611	15:23	SW-846 6010B (Field-Filtered)	QC	AQ	Metals (Dissolved)	4° C/HNO3	1	Plastic - PP	250ml	
03/16/2011	DSY-GW-RB01-031611	15:23	SW-846 8260B	QC	AQ	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	SAMPLE COLLECTED FROM NEW TUBING AND TEFLON BLADDER
03/16/2011	DSY-GW-RB01-031611	15:23	SW-846 6010B	QC	AQ	Metals (Total)	4° C/HNO3	1	Plastic - PP	250ml	
03/16/2011	DSY-GW-RB01-031611	15:23	SW-846 8270C SIM	QC	AQ	PAHs	4°C	2	Glass - Amber	1L	
03/16/2011	DSY-GW-TB01-031611	07:00	SW-846 8260B	QC	AQ	VOCs	4°C/HCL	2	Glass - Clear	40ml vials	
03/17/2011	DSY-GW-MW204-031711	10:49	SW-846 8260B	DSY-MW204	GW	VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
03/17/2011	DSY-GW-MW204-031711	10:49	SW-846 8270C SIM	DSY-MW204	GW	PAHs	4°C	2	Glass - Amber	1L	
03/17/2011	DSY-GW-MW204-031711	10:49	SW-846 6010B	DSY-MW204	GW	Metals (Total)	4° C/HNO3	1	Plastic - PE	250ml	
03/17/2011	DSY-GW-MW204-031711	10:49	SW-846 6010B (Field-Filtered)	DSY-MW204	GW	Metals (Dissolved)	4° C/HNO3	1	Plastic - PE	250ml	

1. Relinquished By: Miki Alroy	Date: 03/18/2011	Time: 18:00	Received By: Federal Express	Date: 03/18/2011	Time: 18:00
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2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
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3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
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Comments:

A-5 FIELD EQUIPMENT CALIBRATION LOG SHEETS



TETRA TECH NUS, INC.

PHOTOIONIZATION DETECTOR FIELD CALIBRATION LOG

Serial No.: 07-02195 Model No.: 10N Decal No.: _____
 Site Name/Location: On-Shore Dorecktor Shipyard - February 2011 Tetra Tech NUS Charge No.: 112G02125

CALIBRATION DATE	STANDARD GAS- ISOBUTYLENE	^{AM} CALIBRATION READING Isobutylene Equiv. (ppm)	^{PM} CALIBRATION CHECK Isobutylene Equiv. (ppm)	SIGNATURE	COMMENTS
2/8/11	Lot # _____ Conc. = _____ ppm	93.1		RWC	<u>Not Used</u>
2/11/11	Lot # <u>LTG 250 MD-CM</u> Conc. = <u>100</u> ppm	99.6		AK	Not Used
2/14/11	Lot # _____ Conc. = _____ ppm	96.1	91.3	RWC	
2/15/11	Lot # _____ Conc. = _____ ppm	102	101	AM P. 1/11 PM 1/11	
2/16	Lot # _____ Conc. = _____ ppm	105	102	RWC	
2/17	Lot # _____ Conc. = _____ ppm	0.0 / 100	88.7	AM PS PM PS	
2/18	Lot # _____ Conc. = _____ ppm	0.0 / 102	0.03 / 100	AM PS PM AC	
2/21	Lot # _____ Conc. = _____ ppm	0.0 / 102	0.0 / 94.0	AM PS PM PS	
	Lot # _____ Conc. = _____ ppm				

Orange KED

→ returned to US-Env
on 2/11/11

TETRA TECH NUS, INC.		PHOTOIONIZATION DETECTOR FIELD CALIBRATION LOG			
Serial No.: <u>5564</u>		Model No.: <u>10N</u>		Decal No.: _____	
Site Name/Location: <u>On-Shore Drecktor Shipyard - February 2011</u>		Tetra Tech NUS Charge No.: <u>112G02125</u>			
CALIBRATION DATE	STANDARD GAS- ISOBUTYLENE	CALIBRATION READING Isobutylene Equiv. (ppm)	CALIBRATION CHECK Isobutylene Equiv. (ppm)	SIGNATURE	COMMENTS
2/8/11	Lot # <u>LT 6200-10-49</u> Conc. = <u>100</u> ppm	99.3	99.8	[Signature]	
2/9/11	Lot # <u>↑</u> Conc. = <u>↑</u> ppm	95.5	104.7	[Signature]	
2/10/11	Lot # <u>↑</u> Conc. = <u>↑</u> ppm	99.5	100.2	Rane	
2/11/11	Lot # <u>↑</u> Conc. = <u>↑</u> ppm	102.9			→ cleaned lamp, re-cal →
2/11/11	Lot # _____ Conc. = _____ ppm	101.6	90.2	[Signature]	day end - outside of acceptable range
	Lot # _____ Conc. = _____ ppm	0.3/101.5		All P.S. [Signature]	B did not use
	Lot # _____ Conc. = _____ ppm				
	Lot # _____ Conc. = _____ ppm				
	Lot # _____ Conc. = _____ ppm				

2/14/11

Orange PTD



TETRA TECH NUS, INC.

PHOTOIONIZATION DETECTOR FIELD CALIBRATION LOG

Serial No.: 85 105454 Model No.: Ion Tiger Decal No.: _____
 Site Name/Location: On-Shore Dorecktor Shipyard - February 2011 Tetra Tech NUS Charge No.: 112G02125

CALIBRATION DATE	STANDARD GAS- ISOBUTYLENE	CALIBRATION READING Isobutylene Equiv. (ppm)	CALIBRATION CHECK Isobutylene Equiv. (ppm)	SIGNATURE	COMMENTS
2/14/11	Lot # <u>LT 6250-MDCM</u> Conc. = <u>100</u> ppm	97.0	95.8	Rmc	
2/15	Lot # _____ Conc. = _____ ppm	100.2	90.4	Rmc P11	
2/16	Lot # _____ Conc. = _____ ppm	102.0	90.5	Rmc	
2/17	Lot # _____ Conc. = _____ ppm		95.9	Rmc	
2/18	Lot # _____ Conc. = _____ ppm	100.3		MIA	
2/21	Lot # _____ Conc. = _____ ppm	0.3 / 101.5	96.4	AM PS PM PS	
2/24	Lot # _____ Conc. = _____ ppm	0.0 / 99.2	160.1	AM AC PM MIA	
2/25	Lot # _____ Conc. = _____ ppm	0.0 / 96.1	92.9	AM ADC PM ADC	
2/26	Lot # _____ Conc. = _____ ppm	0.0 / 99.2	97.7	ADC	

MIA Equipment

Orange PIP



TETRA TECH NUS, INC.

PHOTOIONIZATION DETECTOR FIELD CALIBRATION LOG

Serial No.: 105454Model No.: Ion Tiger



Decal No.: _____

Site Name/Location: On-Shore Dorecktor Shipyard - February 2011Tetra Tech NUS Charge No.: 112G02125

CALIBRATION DATE	STANDARD GAS- ISOBUTYLENE	CALIBRATION READING Isobutylene Equiv. (ppm)	CALIBRATION CHECK Isobutylene Equiv. (ppm)	SIGNATURE	COMMENTS
3/1	Lot # <u>LT6250-NO-CM</u> Conc. = <u>100</u> ppm	0.0 / 99.4	103.8		
3/2	Lot # <u>↑</u> Conc. = _____ ppm	0.0 / 100.2	100.8	M. Alroy	
3/3	Lot # <u>↑</u> Conc. = _____ ppm	0.0 / 103.6	103.6	↑	
3/4	Lot # <u>↑</u> Conc. = _____ ppm	0.0 / 108.7	100.3	M. Alroy	
3/7	Lot # <u>↑</u> Conc. = _____ ppm	0.0 / 113.1	109.1		
3/8	Lot # <u>↑</u> Conc. = _____ ppm	0.0 / 101.5	114.7	Forw Anderson	
	Lot # _____ Conc. = _____ ppm				
	Lot # _____ Conc. = _____ ppm				
	Lot # _____ Conc. = _____ ppm				

Mini Rae

Yellow PTD

Date	Std	Reading	Check	Signature
3/1	see orange PTD	0.0/92.2	109	
3/2/11		0.0/100	101	Peter Sel
3/3/11		0.1/109	110	



TETRA TECH NUS, INC.

YSI 6820 MULTIPARAMETER METER

Serial No.: Probe 10E100466 / 10E100334

Model No.: _____

Decal No.: _____

Site Name: On-Shore Derecktor Shipyard February 2011Job No.: 112G02125

Instrument is calibrated in accordance with Manufacturer's Instructions

DATE:	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #s)	Signature	Remarks
2/14						
Cond. mS/cm		704*	996	US Env. # 8483		* Conductance instead of SPC?
pH=4.0		3.95	4.05	US Env. # 8493		
pH=7.0		7.02	7.05	US Env. # 8484		
pH=10.0		10.09	9.95 10.13	US Env. # 8441		
D.O. mg/l		11.37 / 101.1%	10.09 / 97.2%	DI Water		
REDOX mV						
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

DATE: 2/15						
Cond. mS/cm		941	922			
pH=4.0		3.95	4.02	see		
pH=7.0		7.04	7.96	above		
pH=10.0		10.09	9.95 10.04			
D.O. mg/l		10.94 / 100.3%	11.83 / 102.0%			
REDOX mV						
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

Blue

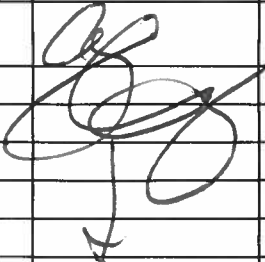
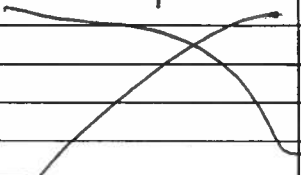


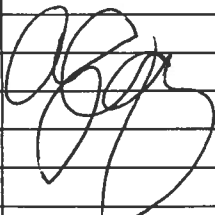
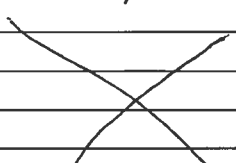
TETRA TECH NUS, INC.

YSI 6820 MULTIPARAMETER METER

Serial No.: Probe 10E100466 / Display 10E100334 Model No.: _____ Decal No.: _____
 Site Name: On-Shore Drecktor Shipyard February 2011 Job No.: 112G02125

Instrument is calibrated in accordance with Manufacturer's Instructions

DATE: 2/14	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks
Cond. mS/cm		956	953			
pH=4.0		4.02	4.07	see 2/14		
pH=7.0		7.01	7.13			
pH=10.0		10.09	10.03			
D.O. mg/l		12.27 / 108.9%	10.20 / 102.1%			
REDOX mV						
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

DATE: 2/17							
Cond. mS/cm		967	928				
pH=4.0		3.96 3.96	4.04	see 2/14			
pH=7.0		7.04	7.03				
pH=10.0		10.05	10.03				
D.O. mg/l		104.3% / 11.77mg/L	9.87mg/L / 95.8%				
REDOX mV							
Turbidity 0 NTUs							
Turbidity 100 NTUs							
Temp °C							
Salinity 0/00							

Blue



TETRA TECH NUS, INC.

YSI 6820 MULTIPARAMETER METER

Serial No.: Probe 10E100466 / Display 10E100334

Model No.: _____

Decal No.: _____

Site Name: On-Shore Drecktor Shipyard February 2011

Job No.: 112G02125

Instrument is calibrated in accordance with Manufacturer's Instructions

DATE: <u>2/18</u>	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks
Cond. mS/cm <u>24.12</u>		<u>973</u>	<u>959</u>			
pH=4.0		<u>3.97</u>	<u>4.02</u>			
pH=7.0		<u>7.11</u>	<u>7.13</u>			
pH=10.0		<u>10.03</u>	<u>10.07</u>	<u>slr 2/14</u>		
D.O. mg/l		<u>10.54 / 100.5%</u>	<u>10.52 / 100.5%</u>			
REDOX mV						
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

DATE: <u>2/22</u>						
Cond. mS/cm		<u>987</u>	<u>942</u>	<u>Lot # 7980</u>		
pH=4.0		<u>3.87</u>	<u>4.04</u>	<u>Lot # 7979</u>		
pH=7.0		<u>6.91</u>	<u>6.95</u>	<u>Lot # 7988</u>		
pH=10.0		<u>10.03</u>	<u>10.01</u>	<u>Lot # 7972</u>		
D.O. mg/l		<u>10.44 mg/L / 95.6%</u>	<u>11.18 mg/L / 100.5%</u>			
REDOX mV						
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

Blue




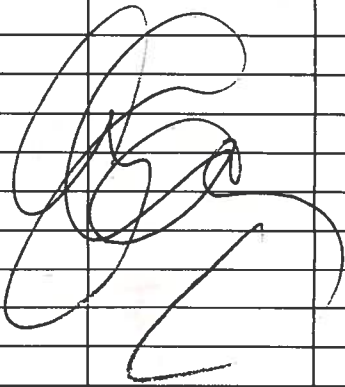
TETRA TECH NUS, INC.

YSI 6820 MULTIPARAMETER METER

Serial No.: Probe 10E 100466 / Display 10E 100334 Model No.: _____ Decal No.: _____
 Site Name: On-Shore Derecktor Shipyard February 2011 Job No.: 112G02125

Instrument is calibrated in accordance with Manufacturer's Instructions

DATE: <u>2/24</u>	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks
Cond. mS/cm		972	933			
pH=4.0		3.93	4.04			
pH=7.0		6.94	7.17	see		
pH=10.0		10.02	10.11	2/22		
D.O. mg/l		9.30 mg/L / 92.70	11.70 / 95%			
REDOX mV		124.1 @ 10°C	143.1 @ 11.2°C			
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

DATE: <u>2/26</u>						
Cond. mS/cm		948	943			
pH=4.0		3.94	3.97			
pH=7.0		6.95	6.93			
pH=10.0		9.98	10.03			
D.O. mg/l		10.12 mg/L / 96.0%	9.63 mg/L / 92.5			
REDOX mV		145.5 @ 12.7°C	141.5			
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

MTA Equipment



TETRA TECH NUS, INC.

YSI 6820 MULTIPARAMETER METER

Serial No.: 03F042Q Model No.: Professional+ Decal No.: _____
 Site Name: Derecktor Shipyard Job No.: 112G02125

Instrument is calibrated in accordance with Manufacturer's Instructions

DATE:	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks
Cond. mS/cm 3/1		0.924	0.906			
pH=4.0		4.07	4.02			
pH=7.0		7.13	7.09			
pH=10.0		10.11	10.07			
D.O. mg/l		10.32mg/L / 100%	10.35 / 98%			
REDOX mV		243.2	244			
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

see
Blue YSI
for same
date

DATE:						
Cond. mS/cm						
pH=4.0						
pH=7.0						
pH=10.0						
D.O. mg/l						
REDOX mV						
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

Blue



TETRA TECH NUS, INC.

YSI 6820 MULTIPARAMETER METER

Serial No.: 03F0022Q Model No.: Professional† Decal No.: _____
 Site Name: Derecktor Shipyard Job No.: 112G02125

Instrument is calibrated in accordance with Manufacturer's Instructions

DATE: <u>3/1</u>	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #s)	Signature	Remarks
Cond. mS/cm		0.944	0.941	#7980		
pH=4.0		4.00	3.99	#7979		
pH=7.0		6.95	6.96	#7988		
pH=10.0		10.02	9.99	#7972		
D.O. mg/l		11.23 mg/L / 105.0%	10.87 / 94.7%			
REDOX mV		239.3	199	10F100001 Zobell solution		
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

DATE: <u>3/2</u>						
Cond. mS/cm		9.23	9.14	see above	758.3 mmHg	
pH=4.0		3.99	4.03			
pH=7.0		6.94	7.0			
pH=10.0		9.98	10.0			
D.O. mg/l		9.73 mg/L / 93.7%	9.19 mg/L - 94.0%			
REDOX mV		200.0	164.8			
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C			15.4			
Salinity 0/00						

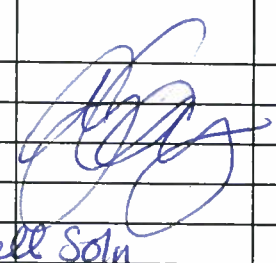


TETRA TECH NUS, INC.

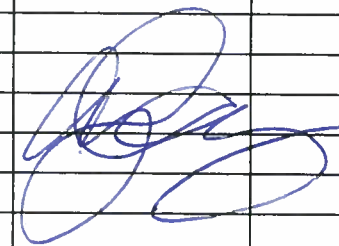
YSI 6820 MULTIPARAMETER METER

Serial No.: 03F0320 Model No.: Professional Decal No.: _____
Site Name: Derecktor Shipyard Job No.: 112G02125

Instrument is calibrated in accordance with Manufacturer's Instructions

DATE: <u>3/3</u>	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks
Cond. mS/cm		<u>0.921</u>	<u>0.933</u>	# 7980		
pH=4.0		<u>4.00</u>	<u>4.02</u>	# 7979		
pH=7.0		<u>6.96</u>	<u>6.96</u>	# 7988		
pH=10.0		<u>10.05</u>	<u>10.04</u>	# 7972		
D.O. mg/l	<u>ADC</u>	<u>10.29 mg/L</u>	<u>10.06</u>			
REDOX mV	<u>283</u>	<u>247.1</u>	<u>231.9</u>	<u>10F100001 Zobell Soln</u>		
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C		<u>10°</u>	<u>10°</u>			
Salinity 0/00						

03F0420not blue → but still used by Amy

DATE: <u>3/7</u>						
Cond. mS/cm		<u>0.981</u>	<u>0.924</u>	<u>see above</u>		
pH=4.0	<u>4.31</u>	<u>4.00</u>	<u>4.14</u>			
pH=7.0	<u>6.72</u>	<u>7.06</u>	<u>7.09</u>			
pH=10.0		<u>10.16</u>	<u>10.13</u>			
D.O. mg/l		<u>10.92 mg/L</u>	<u>10.02</u>			
REDOX mV						
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

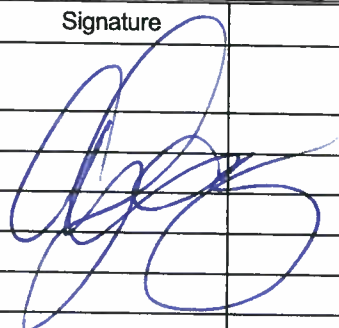


TETRA TECH NUS, INC.

YSI 6820 MULTIPARAMETER METER

Serial No.: 03F0420 Model No.: Professional+ Decal No.: _____
Site Name: Derecktor Shipyard Job No.: 112G02125

Instrument is calibrated in accordance with Manufacturer's Instructions

DATE: <u>3/8</u>	Pre Calibration Readings	Post Calibration Readings	PM Check	Calibration STDs (lot #'s)	Signature	Remarks
Cond. mS/cm		<u>0.931</u>	<u>0.969</u>			
pH=4.0		<u>4.08</u>	<u>4.16</u>			
pH=7.0		<u>7.15</u>	<u>7.06</u>			
pH=10.0		<u>10.10</u>	<u>10.20</u>			
D.O. mg/l		<u>11.36 mg/L / 103.2%</u>	<u>11.39 / 102%</u>	<u>see previous day</u>		
REDOX mV						
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C			<u>10.4</u>			
Salinity 0/00						

DATE:						
Cond. mS/cm						
pH=4.0						
pH=7.0						
pH=10.0						
D.O. mg/l						
REDOX mV						
Turbidity 0 NTUs						
Turbidity 100 NTUs						
Temp °C						
Salinity 0/00						

[illegible]

A-6 WELL DEVELOPMENT RECORDS

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID:	DEVELOPMENT LOG-DSY-MW02A	Sampler:	Amy Carey
Well ID:	DSY-MW02A	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	11.82
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	0.8
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	N/A	Sample Method	NA

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/16/11	11:35	12.51	2800.0	Highly Turbid	None	7.67	1.006	0.96	1640	10.8	NA	NA	NA
02/16/11	11:50	12.55	3000.0	Cloudy	None	8.09	1.051	1.13	221	11.2	NA	NA	NA
02/16/11	12:06	12.19	2000.0	Cloudy	None	8.17	0.981	1.12	64.5	11.1	NA	NA	NA
02/16/11	12:20	11.99	1200.0	Cloudy	None	8.21	0.959	1.48	1993	9.8	NA	NA	NA
02/16/11	12:35	12.02	1200.0	Cloudy	None	8.28	0.926	1.28	109.9	9.6	NA	NA	NA
02/16/11	12:51	12.02	1200.0	Highly Turbid	None	8.28	0.971	1.31	10000	9.2	NA	NA	NA
02/16/11	13:06	12.02	1000.0	Highly Turbid	None	8.30	0.997	1.34	10000	9.6	NA	NA	NA
02/16/11	13:24	12.22	1000.0	Highly Turbid	None	8.34	1.029	0.52	10000	9.8	NA	NA	NA
02/16/11	14:04	12.39	2600.0	Highly Turbid	None	8.01	1.175	0.79	10000	11.1	NA	NA	NA
02/16/11	14:20	12.50	2400.0	Cloudy	None	7.92	1.177	1.06	1294	10.7	NA	NA	NA
02/16/11	14:34	12.47	2800.0	Cloudy	None	7.89	1.182	0.90	180	11.4	NA	NA	NA
02/16/11	14:49	12.49	3200.0	Cloudy	None	7.90	1.131	0.92	185	11.7	NA	NA	NA
02/16/11	15:05	12.40	3200.0	Highly Turbid	None	7.91	1.148	0.82	185	11.2	NA	NA	NA
02/16/11	15:20	12.05	1210.0	Cloudy	None	7.97	1.074	1.09	85.1	9.41	NA	NA	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11:35	15:20	225	462.95	Cloudy	None	7.97	1.074	1.09	85.1	9.41	NA	NA	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
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General Notes

Amy Carey was the developer

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DEVELOPMENT LOG-DSY-MW03** Sampler: Amy Carey
 Well ID: DSY-MW03 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	5.69 TPVC; 6.92 TOC
Top of Screen (ft-BTOR)	5.79	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	15.79	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	17.00	Sample Method	N/A

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/14/11	11:49	11.00	2600.0	Cloudy	None	7.18	0.288	7.20	176	8.8	NA	NA	NA
02/14/11	12:06	12.83	2100.0	Highly Turbid	None	5.74	0.383	5.06	2500	11.2	NA	NA	NA
02/14/11	12:21	12.44	1800.0	Highly Turbid	None	5.69	0.399	5.00	2208	11.2	NA	NA	NA
02/14/11	12:37	13.25	2200.0	Highly Turbid	None	5.67	0.400	4.42	308	11.3	NA	NA	NA
02/14/11	12:53	13.78	2200.0	Highly Turbid	None	5.64	0.400	4.45	1587	11.1	NA	NA	NA
02/14/11	13:23	9.25	850.0	Highly Turbid	None	5.71	0.746	4.80	4070	10.7	NA	NA	NA
02/14/11	13:48	9.59	1000.0	Highly Turbid	None	5.63	0.379	4.71	7242	11.1	NA	NA	NA
02/14/11	14:06	9.32	1150.0	Highly Turbid	None	5.67	0.376	4.89	7612	10.4	NA	NA	NA
02/14/11	14:21	8.53	1300.0	Highly Turbid	None	5.66	0.388	4.94	10000	11.1	NA	NA	NA
02/14/11	14:40	8.92	1000.0	Highly Turbid	None	5.73	0.380	4.88	10000	11.3	NA	NA	NA
02/14/11	15:00	8.32	1200.0	Highly Turbid	None	5.64	0.384	4.84	10000	10.9	NA	NA	NA
02/14/11	15:14	8.20	800.0	Highly Turbid	None	5.71	0.382	4.96	10000	11.0	NA	NA	NA
02/14/11	15:28	9.61	1600.0	Slightly Turbid	None	5.76	0.389	5.00	1261	10.9	NA	NA	NA
02/14/11	15:42	11.62	3200.0	Slightly Turbid	None	5.81	0.402	4.55	246	10.6	NA	NA	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11:49	15:42	233	345.2	Slightly Turbid	None	5.81	0.402	4.55	246	10.6	NA	NA	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
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General Notes

Initial sounding of monitoring well MW-03 indicated a hard bottom @ 17.83' below top of casing. PVC to far down inb well to measure accurately.

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Dereecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DEVELOPMENT LOG-DSY-MW08** Sampler: Amy Carey
 Well ID: DSY-MW08 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	7.06
Top of Screen (ft-BTOR)	6.05	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	11.05	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	11.50	Sample Method	NA

Equipment

Water Quality Meter:	03F032Q	Pump Control Box:	N/A	Turbidity Meter:	14431
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/15/11	9:25	9.15	500.0	Slightly Turbid	None	6.52	1.044	4.58	95	6.2	NA	NA	NA
02/15/11	9:40	9.49	600.0	Cloudy	None	6.23	1.073	2.91	811	6.8	NA	NA	NA
02/15/11	9:55	9.49	600.0	Cloudy	None	6.24	1.078	2.23	721	6.6	NA	NA	NA
02/15/11	10:11	9.75	1000.0	Highly Turbid	None	6.26	1.077	2.01	7756	7.6	NA	NA	NA
02/15/11	10:27	8.81	1000.0	Highly Turbid	None	6.19	1.068	2.06	10000	7.9	NA	NA	NA
02/15/11	10:41	8.40	950.0	Highly Turbid	None	6.22	1.063	2.03	10000	7.7	NA	NA	NA
02/15/11	10:58	8.25	1000.0	Highly Turbid	None	6.22	1.055	1.68	10000	7.6	NA	NA	NA
02/15/11	11:11	9.76	1400.0	Highly Turbid	None	6.23	1.051	2.00	10000	8.2	NA	NA	NA
02/15/11	11:25	8.71	2000.0	Highly Turbid	None	6.22	1.046	1.58	1806	8.5	NA	NA	NA
02/15/11	11:40	8.45	2200.0	Highly Turbid	None	6.19	1.046	1.48	1229	8.3	NA	NA	NA
02/15/11	11:55	8.22	1200.0	Highly Turbid	None	6.19	1.026	1.66	10000	8.7	NA	NA	NA
02/15/11	12:10	8.01	800.0	Highly Turbid	None	6.24	1.031	1.93	10000	7.7	NA	NA	NA
02/15/11	12:29	7.77	600.0	Highly Turbid	None	6.29	1.033	2.16	10000	6.8	NA	NA	NA
02/15/11	12:39	7.71	400.0	Highly Turbid	None	6.41	1.031	1.90	10000	7.7	NA	NA	NA
02/15/11	12:54	8.65	1000.0	Highly Turbid	None	6.49	1.030	2.21	10000	6.9	NA	NA	NA
02/15/11	13:10	7.28	1600.0	Slightly Turbid	None	6.28	1.044	1.35	202	7.1	NA	NA	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:25	13:10	225	245.5	Slightly Turbid	None	6.28	1.044	1.35	202	7.1	NA	NA	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
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General Notes

None

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID:	DEVELOPMENT LOG-DSY-MW12	Sampler:	Amy Carey
Well ID:	DSY-MW12	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	7.95 TPVC
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	20.2
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	N/A	Sample Method	N/A

Equipment

Water Quality Meter:	03F032Q	Pump Control Box:	N/A	Turbidity Meter:	14431
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/17/11	9:29	9.18	1400.0	Highly Turbid	None	6.57	0.609	3.27	10000	12.9	NA	NA	NA
02/17/11	9:45	9.54	1600.0	Highly Turbid	None	7.37	0.626	1.60	79.9	12.9	NA	NA	NA
02/17/11	10:15	9.45	2000.0	Cloudy	None	7.74	0.667	0.91	233	12.6	NA	NA	NA
02/17/11	10:28	9.41	2000.0	Highly Turbid	None	7.64	0.623	0.89	10000	13.3	NA	NA	NA
02/17/11	10:46	9.30	2400.0	Highly Turbid	None	7.74	0.650	1.13	1462	12.6	NA	NA	NA
02/17/11	10:58	9.28	2300.0	Highly Turbid	None	7.45	0.619	0.92	1030	13.0	NA	NA	NA
02/17/11	11:21	9.27	2600.0	Cloudy	None	7.52	0.623	1.17	184	13.2	NA	NA	NA
02/17/11	11:34	8.72	800.0	Highly Turbid	None	7.35	0.606	1.75	10000	13.1	NA	NA	NA
02/17/11	11:50	8.01	1600.0	Highly Turbid	None	7.66	0.619	2.05	10000	11.9	NA	NA	NA
02/17/11	12:05	989	2200.0	Highly Turbid	None	7.39	0.602	2.17	10000	12.7	NA	NA	NA
02/17/11	12:20	9.86	1400.0	Highly Turbid	None	7.69	0.635	2.00	10000	12.5	NA	NA	NA
02/17/11	12:34	7.88	900.0	Highly Turbid	None	7.35	0.598	2.35	10000	12.0	NA	NA	NA
02/17/11	12:50	8.88	1200.0	Cloudy	None	7.67	0.623	1.99	826	12.3	NA	NA	NA
02/17/11	13:14	8.86	1200.0	Cloudy	None	7.25	0.612	1.67	220	12.3	NA	NA	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:29	13:14	225	392.8	Cloudy	None	7.25	0.612	1.67	220	12.3	NA	NA	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
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General Notes

hard bottom of well when first opened. Developer is Amy Carey.

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID:	DEVELOPMENT LOG-DSY-MW218	Sampler:	Amy Carey
Well ID:	DSY-MW218	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	15.37
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	8.0
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	N/A	Sample Method	Development only - No sampling

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/15/11	14:30	15.42	3500.0	Highly Turbid	None	6.48	0.943	0.26	10000	9.8	NA	NA	NA
02/15/11	14:45	15.42	2800.0	Highly Turbid	None	6.68	1.286	1.23	10000	8.9	NA	NA	NA
02/15/11	15:01	15.43	2400.0	Highly Turbid	None	6.71	1.345	1.20	3324	9.9	NA	NA	NA
02/15/11	15:17	15.44	400.0	Highly Turbid	None	6.71	0.878	1.57	10000	7.8	NA	NA	NA
02/15/11	15:36	15.44	900.0	Highly Turbid	None	6.58	0.767	1.21	10000	7.8	NA	NA	NA
02/15/11	15:46	15.42	800.0	Highly Turbid	None	6.75	0.781	1.49	10000	8.0	NA	NA	NA
02/15/11	16:02	15.41	1200.0	Highly Turbid	None	6.42	0.789	1.19	10000	8.8	NA	NA	NA
02/15/11	16:15	15.41	1000.0	Highly Turbid	None	6.72	0.843	1.58	10000	8.4	NA	NA	NA
02/15/11	16:30	15.41	1200.0	Highly Turbid	None	6.74	0.732	1.41	10000	8.3	NA	NA	NA
02/15/11	16:47	15.41	800.0	Highly Turbid	None	6.59	0.738	1.33	10000	7.0	NA	NA	NA
02/15/11	17:00	15.41	3600.0	Highly Turbid	None	6.68	0.799	1.12	1667	8.6	NA	NA	NA
02/16/11	9:05	15.21	2400.0	Highly Turbid	None	6.69	1.249	1.90	2249	10.4	NA	NA	NA
02/16/11	9:20	15.42	2400.0	Cloudy	None	6.69	1.272	0.92	183	11.6	NA	NA	NA
02/16/11	9:35	15.42	2400.0	Slightly Turbid	None	6.66	1.355	0.95	89.1	11.7	NA	NA	NA
02/16/11	9:50	15.23	2400.0	Clear	None	6.68	1.228	0.93	90.2	12.2	NA	NA	NA
02/16/11	10:05	15.20	2400.0	Clear	None	6.69	1.099	0.94	12.3	12.0	NA	NA	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:05	17:00	475	1294.0	Clear	None	6.69	1.099	0.94	12.3	12.0	NA	NA	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
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General Notes

Amy Carey was developer.

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID:	DEVELOPMENT LOG-DSY-MW219	Sampler:	Amy Carey
Well ID:	DSY-MW219	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	14.17 TPVC
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	2.2
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	N/A	Sample Method	N/A

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/07/11	9:15	14.51	3200.0	Highly Turbid	None	7.07	0.637	1.33	NA	9.4	NA	NA	NA
03/07/11	9:30	17.71	3200.0	Clear	None	6.79	0.660	2.63	NA	9.9	NA	NA	NA
03/07/11	9:45	16.10	600.0	Highly Turbid	None	6.84	0.684	1.18	NA	9.7	NA	NA	NA
03/07/11	10:00	15.79	2000.0	Highly Turbid	None	6.85	0.706	1.07	NA	9.5	NA	NA	NA
03/07/11	10:15	15.76	1600.0	Highly Turbid	None	6.84	0.664	0.12	NA	9.2	NA	NA	NA
03/07/11	10:30	15.71	1800.0	Highly Turbid	None	6.84	0.684	0.49	NA	9.1	NA	NA	NA
03/07/11	10:45	15.52	1600.0	Highly Turbid	None	6.85	0.671	1.29	NA	9.6	NA	NA	NA
03/07/11	11:00	15.88	1600.0	Highly Turbid	None	6.81	0.689	0.50	NA	9.2	NA	NA	NA
03/07/11	11:15	16.10	1400.0	Highly Turbid	None	6.81	0.695	0.37	NA	9.4	NA	NA	NA
03/07/11	11:30	16.10	2000.0	Highly Turbid	None	6.83	0.692	0.95	NA	9.7	NA	NA	NA
03/07/11	11:45	16.17	2000.0	Highly Turbid	None	6.85	0.695	1.62	NA	9.5	NA	NA	NA
03/07/11	12:00	16.45	2000.0	Highly Turbid	None	6.85	0.694	1.04	NA	9.4	NA	NA	NA
03/07/11	12:15	16.42	2000.0	Highly Turbid	None	6.86	0.690	1.45	NA	9.2	NA	NA	NA
03/07/11	12:30	16.51	2000.0	Cloudy	None	6.85	0.689	1.09	530	9.3	NA	NA	NA
03/07/11	12:45	16.55	1200.0	Cloudy	None	6.93	0.695	1.01	425	8.8	NA	NA	NA
03/07/11	13:00	15.87	1000.0	Cloudy	None	6.92	0.702	2.00	463	8.5	NA	NA	NA
03/07/11	13:15	15.33	1000.0	Cloudy	None	9.92	0.695	1.98	437	8.8	NA	NA	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:15	13:15	240	405.0	Cloudy	None	9.92	0.695	1.98	437	8.8	NA	NA	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
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General Notes

Amy Carey

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecoctor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DEVELOPMENT LOG-DSY-MW220** Sampler: Robin Clark
 Well ID: DSY-MW220 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information

Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	7.86
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	N/A	Sample Method	N/A

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/17/11	9:11	7.86	1000.0	Clear	None	NA	NA	NA	NA	NA	NA	NA	N/A
02/17/11	9:53	8.32	1000.0	Highly Turbid	None	7.23	1693	1.89	9999	11.2	278.8	NA	N/A
02/17/11	10:11	8.32	1000.0	Highly Turbid	None	7.49	1775	2.25	9999	11.5	230.4	NA	N/A
02/17/11	10:31	8.32	1000.0	Highly Turbid	None	7.40	1750	2.24	9999	10.8	230.7	NA	N/A
02/17/11	10:44	8.32	1000.0	Highly Turbid	None	7.51	1839	1.18	9999	11.2	182.3	NA	N/A
02/17/11	11:01	8.48	1000.0	Highly Turbid	None	7.23	2179	0.76	2879	12.1	124.0	NA	N/A
02/17/11	11:17	8.45	1000.0	Highly Turbid	None	7.51	1923	0.31	9999	12.3	54.4	NA	N/A
02/17/11	11:36	8.45	1000.0	Highly Turbid	None	7.14	2069	1.30	9999	12.1	59.3	NA	N/A
02/17/11	11:47	8.45	1000.0	Highly Turbid	None	7.45	2090	1.10	9999	11.2	59.9	NA	N/A
02/17/11	12:08	8.48	1000.0	Highly Turbid	None	7.11	2019	1.21	9999	11.4	54.6	NA	N/A
02/17/11	12:18	8.48	1000.0	Highly Turbid	None	7.45	2049	0.88	9999	11.5	22.9	NA	N/A
02/17/11	12:37	8.50	1000.0	Cloudy	None	7.19	1992	1.30	817	11.3	13.2	NA	N/A
02/17/11	12:52	8.50	1000.0	Cloudy	None	7.49	2019	1.29	306	11.6	-41.9	NA	N/A
02/17/11	12:59	8.50	1000.0	Cloudy	None	7.07	1979	1.12	240	11.6	-32.4	NA	N/A
02/17/11	13:10	8.50	1000.0	Cloudy	None	NA	NA	NA	NA	NA	NA	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:11	13:10	239	239.0	Cloudy	None	NA	NA	NA	NA	NA	NA	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
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General Notes

Amy Carey was the developer.

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID: **DEVELOPMENT LOG-DSY-MW221** Sampler: Amy Carey
 Well ID: DSY-MW221 Well Type: Monitoring Well
 QC Duplicate ID: N/A MS/MSD: N/A

Well Information

Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	7.16 tpvc
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	2.3
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	N/A	Sample Method	N/A

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/18/11	9:42	7.64	1200.0	Highly Turbid	None	5.85	0.535	3.99	NA	11.5	NA	NA	NA
02/18/11	9:57	7.66	1600.0	Highly Turbid	None	5.97	0.593	2.13	NA	11.4	NA	NA	NA
02/18/11	10:12	7.70	1600.0	Highly Turbid	None	6.05	0.571	1.45	NA	11.2	NA	NA	NA
02/18/11	10:27	7.60	1600.0	Highly Turbid	None	6.11	0.563	2.42	NA	11.1	NA	NA	NA
02/18/11	10:42	7.61	1200.0	Highly Turbid	None	6.14	0.554	2.56	NA	11.3	NA	NA	NA
02/18/11	10:57	6.68	1200.0	Highly Turbid	None	6.17	0.543	2.70	NA	11.3	NA	NA	NA
02/18/11	11:13	7.68	1600.0	Highly Turbid	None	6.22	0.526	2.31	NA	11.7	NA	NA	NA
02/18/11	11:27	7.71	1700.0	Highly Turbid	None	6.21	0.521	1.77	NA	11.6	NA	NA	NA
02/18/11	11:42	7.71	1300.0	Highly Turbid	None	6.21	0.512	1.93	NA	11.5	NA	NA	NA
02/18/11	11:57	7.71	1400.0	Highly Turbid	None	6.22	0.508	2.49	NA	11.7	NA	NA	NA
02/18/11	12:13	7.62	2000.0	Highly Turbid	None	6.13	0.502	1.66	NA	11.8	NA	NA	NA
02/18/11	12:27	7.72	1800.0	Highly Turbid	None	6.19	0.495	2.43	NA	11.4	NA	NA	NA
02/18/11	12:42	7.65	800.0	Highly Turbid	None	6.18	0.490	2.85	NA	10.6	NA	NA	NA
02/18/11	12:57	7.68	1200.0	Highly Turbid	None	6.14	0.499	6.11	NA	10.7	NA	NA	NA
02/18/11	13:12	7.67	1000.0	Highly Turbid	None	6.11	0.502	1.94	1737	10.4	NA	NA	NA
02/18/11	13:29	7.69	1000.0	Highly Turbid	None	6.12	0.510	1.57	1894	11.1	NA	NA	NA
02/18/11	13:42	7.64	600.0	Highly Turbid	None	6.17	0.514	2.53	1456	12.0	NA	NA	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:42	13:42	240	324.9	Highly Turbid	None	6.17	0.514	2.53	1456	12.0	NA	NA	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
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General Notes

Amy Carey is the developer.
 Based on experience developing new wells 02A and 220, a surge block was not used here. Very silty, sandy water comes up with the foot-valve and a surge block creates so much it starts to fill in the well.
 Well had some amount of silt on the bottom when first started purging (soft).

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID:	DEVELOPMENT LOG-DSY-MW222	Sampler:	Amy Carey
Well ID:	DSY-MW222	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	5.53
Top of Screen (ft-BTOR)	4	H&S PID Monitor Reading (ppm)	0.2
Bottom of Screen (ft-BTOR)	14	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	14	Sample Method	watererra pump

Equipment

Water Quality Meter:	03F032Q	Pump Control Box:	N/A	Turbidity Meter:	14431
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
02/22/11	7:47	5.94	1000.0	Highly Turbid	None	7.35	1.070	4.68	NA	4.6	NA	NA	NA
02/22/11	8:04	6.02	1200.0	Highly Turbid	None	7.46	1.101	8.40	NA	6.0	NA	NA	NA
02/22/11	8:17	6.00	1600.0	Highly Turbid	None	7.49	1.044	8.15	NA	4.9	NA	NA	NA
02/22/11	8:40	5.57	1500.0	Highly Turbid	None	7.44	1.050	8.19	NA	5.2	NA	NA	NA
02/22/11	8:57	5.56	1300.0	Highly Turbid	None	7.57	0.912	7.84	NA	4.7	NA	NA	NA
02/22/11	9:09	5.91	400.0	Highly Turbid	None	7.66	0.933	11.74	NA	1.1	NA	NA	NA
02/22/11	9:32	5.88	500.0	Highly Turbid	None	7.61	0.859	7.92	NA	4.1	NA	NA	NA
02/22/11	9:47	5.88	1400.0	Highly Turbid	None	7.57	0.971	8.82	NA	5.8	NA	NA	NA
02/22/11	10:03	5.88	1400.0	Highly Turbid	None	7.57	0.890	8.42	NA	6.2	NA	NA	NA
02/22/11	10:17	5.88	1200.0	Highly Turbid	None	7.56	0.871	8.40	NA	6.2	NA	NA	NA
02/22/11	10:32	5.81	1200.0	Highly Turbid	None	7.54	0.860	8.42	NA	5.9	NA	NA	NA
02/22/11	10:47	5.91	1200.0	Highly Turbid	None	7.54	0.867	8.32	NA	6.4	NA	NA	NA
02/22/11	11:02	5.81	1000.0	Highly Turbid	None	7.58	0.865	8.54	NA	6.0	NA	NA	NA
02/22/11	11:17	5.85	1200.0	Highly Turbid	None	7.58	0.845	8.36	NA	6.7	NA	NA	NA
02/22/11	11:32	5.87	1200.0	Highly Turbid	None	7.56	0.832	7.92	NA	6.5	NA	NA	NA
02/22/11	11:47	5.85	1600.0	Highly Turbid	None	7.54	0.821	7.54	NA	6.6	NA	NA	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
7:47	11:47	240	285.3	Highly Turbid	None	7.54	0.821	7.54	NA	6.6	NA	NA	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
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General Notes

None

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID:	DEVELOPMENT LOG-DSY-MW223	Sampler:	Robin Clark
Well ID:	DSY-MW223	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	N/A	Static Water Level (ft-BTOR)	11.66 PVC
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	0.3
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	N/A	Sample Method	INERTIAL PUMP

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
03/08/11	8:55	12.30	3200.0	Highly Turbid	None	11.96	0.871	2.33	NA	12.9	NA	NA	NA
03/08/11	9:10	13.45	3200.0	Highly Turbid	None	9.78	0.358	0.78	NA	13.7	NA	NA	NA
03/08/11	9:25	13.60	3200.0	Cloudy	None	8.62	0.342	0.84	376	13.8	NA	NA	NA
03/08/11	9:40	12.76	3200.0	Cloudy	None	7.31	0.329	1.27	168	13.6	NA	NA	NA
03/08/11	9:55	12.74	3200.0	Slightly Turbid	None	7.01	0.323	0.83	127	14.0	NA	NA	N/A
03/08/11	10:10	12.75	3200.0	Slightly Turbid	None	6.92	0.321	1.44	85	14.0	NA	NA	NA
03/08/11	10:25	12.77	2000.0	Slightly Turbid	None	6.88	0.323	1.29	19.2	14.0	NA	NA	NA
03/08/11	10:40	12.72	2800.0	Slightly Turbid	None	6.91	0.323	0.84	32.9	14.1	NA	NA	NA
03/08/11	10:55	12.59	1000.0	Highly Turbid	None	8.13	0.358	0.82	11544	13.3	NA	NA	NA
03/08/11	11:10	12.59	2000.0	Clear	None	7.83	0.349	0.85	1857	13.4	NA	NA	NA
03/08/11	11:25	12.55	1300.0	Slightly Turbid	None	7.32	0.331	1.04	136	13.9	NA	NA	NA
03/08/11	11:40	12.54	1400.0	Slightly Turbid	None	7.04	0.327	1.01	40.9	14	NA	NA	N/A
03/08/11	11:55	12.52	1200.0	Slightly Turbid	None	6.98	0.326	1.42	29.2	13.8	NA	NA	N/A
03/08/11	12:10	12.50	1200.0	Slightly Turbid	None	7.00	0.328	1.38	71	13.5	NA	NA	N/A
03/08/11	12:25	12.62	2200.0	Slightly Turbid	None	6.88	0.316	0.92	186	14.1	na	na	NA
03/08/11	12:40	12.69	2400.0	Cloudy	None	6.78	0.312	0.71	51.5	14.0	NA	NA	NA
03/08/11	12:55	12.78	3200.0	Slightly Turbid	None	6.73	0.311	1.24	87.6	14.3	NA	NA	NA

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
8:55	12:55	240	550.5	Slightly Turbid	None	6.73	0.311	1.24	87.6	14.3	NA	NA	NA

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
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General Notes

Amy Carey

GROUNDWATER SAMPLE LOG SHEET

Event: Study Area Screening Evaluation - Site 19
 Site Name: Newport NS - Site 19 - On-Shore Derecktor Shipyard
 Project No: 112G02125.SA.DM (ED00000152)

Log Page 1 of 1

Sample ID:	DEVELOPMENT LOG-DSY-MW224	Sampler:	N/A
Well ID:	DSY-MW224	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	N/A
Top of Screen (ft-BTOR)	N/A	H&S PID Monitor Reading (ppm)	N/A
Bottom of Screen (ft-BTOR)	N/A	Purge Method	Surge block and inertial pump
Total Depth of Well (ft-BTOR)	N/A	Sample Method	N/A

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A
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Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
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Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
N/A	N/A	N/A	N/A	Clear	None	6.81	326.1	0.29	50	12.1	-52.7	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✗	N/A	N/A	VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	N/A

General Notes

None

APPENDIX B

SOIL BORING AND MONITORING WELL CONSTRUCTION LOGS

B-1 SOIL BORING LOGS

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB201
 START DATE: 2/11/2011
 COMPLETION DATE: 2/11/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	2	2.0 2.0	S-1	Sandy SILT with Gravel	loose	dark brown	SILT and Fine SAND, little F/M rounded Gravel	ML	dry			0.1
	5											
1	11											
	10	1.5 2.0	S-2 (DSY-SB201-SO-0204)	Poorly Graded GRAVEL with Silt	loose		Weathered PHYLLITE, some Silt	GP-GM	dry			0.6
2	7											
	8											
3	5	1.0 2.0	S-3		very loose	grey				None		0.2
	4											
4	4											
	3	1.7 2.0	S-4	SILTY GRAVEL	very loose	grey	SILT and Weathered PHYLLITE	GM	damp			0.1
5	3											
	3											
6	3	1.6 2.0	S-5		loose							0.5
	3											
7	3											
	3	1.6 2.0	S-5		loose							0.5
8	5											
	4											
9	5	1.6 2.0	S-5		loose							0.5
	4											
10	4											

TYPE OF DRILLING RIG: CME 75
 METHOD OF ADVANCING BORING: Hollow-Stem Auger
 METHOD OF SOIL SAMPLING: 2" and 3" Split-Spoon (2" for S-1 and S-2 intervals and 3" for all others)
 METHOD OF ROCK CORING: NA
 GROUNDWATER LEVELS: NA
 OTHER OBSERVATIONS: Sample DSY-SB201-SO-0204 was collected and analyzed by Empirical Laboratories, LLC for PAHs and Metals




BORING LOG FOR: NS Newport - Site 19 - On-Shore Drecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB201
 START DATE: 2/11/2011
 COMPLETION DATE: 2/11/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)		
10	5	1.7 2.0	S-6	SILTY GRAVEL	loose	grey	SILT and Weathered PHYLLITE	GP-GC	damp	None		0.0		
	4													
11	5													
	4													
12	6	1.8 2.0	S-7	SILTY SAND		dark brown	Fine SAND,little Silt	SM				0.1		
	6													
13	7			Poorly Graded SAND with Silt and Gravel		brown	Silty Fine SAND,some M/C Sand,rounded Fine Gravel	SP-SM						
	9													
14	8	2.0 2.0	S-8	Silty GRAVEL with Sand	medium dense	grey	Silty F/C SAND,F/M subangular/subrounded Gravel - Glacial Till from 14' to 18'	GM				0.4		
	17													
15	22													
	18													
16	14	2.0 2.0	S-9											0.3
	15													
17	17													
	18													

18 EOB - 18.0' bgs


TYPE OF DRILLING RIG:	CME 75	 TETRA TECH
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	
METHOD OF SOIL SAMPLING:	2" and 3" Split-Spoon (2" for S-1 and S-2 intervals and 3" for all others)	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:		
BORING NO.: DSY-SB201		Page 2 of 2

BORING LOG FOR: NS Newport - Site 19 - On-Shore Drecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB202
 START DATE: 2/9/2011
 COMPLETION DATE: 2/9/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)		
0	1	1.8 / 2.0	S-1	Sandy SILT with Gravel	loose	dark brown	SILT,little F/C Sand,Gravel - crushed cobble in spoon	ML	moist	None		0.4		
	5													
1	12													
	11													
2	6	1.8 / 2.0	S-2 (DSY- SB202-SO- 0204)			grey	SILT,some weathered Bedrock (Phyllite),little Sand		damp				0.3	
	5													
3	6													
	6													
4	3	2.0 / 2.0	S-3	Sandy SILT with Gravel	loose	brown	SILT,some weathered Bedrock,little F/C Sand	ML	damp	None			0.3	
	3													
5	5													
	5													
6	2	1.3 / 2.0	S-4		very loose		SILT,some weathered Bedrock (Phyllite),little F/C Sand					0.1		
	3													
7	3													
	5													
8	2	1.3 / 2.0	S-5	Sandy SILT with Gravel	very loose	brown	SILT,some weathered Bedrock (Phyllite),little F/C Sand	ML	damp	None		0.1		
	2													
9	3													
	2													

10

TYPE OF DRILLING RIG:	CME 75	 TETRA TECH
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:	Sample DSY-SB202-SO-0204 was collected and analyzed by Empirical Laboratories, LLC for PAHs and Metals	
BORING NO.: DSY-SB202		Page 1 of 2

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecoctor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB202
 START DATE: 2/9/2011
 COMPLETION DATE: 2/9/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	2	1.4 2.0	S-6	Sandy SILT with Gravel	very loose	brown	Top 0.4' - SILT,some weathered Bedrock (Phyllite),little F/C Sand	ML	damp	None		0.1
	2			Organic SILT	soft	dark brown	Bottom 1.0': Organic SILT,trace F/C Sand	OL		Organic - slight		
11	3											
	5											
12	3	2.0 2.0	S-7	Organic SILT	soft	dark brown	Top 0.3': Organic SILT,trace F/C Sand	OL	damp	Odor - slight		0.2
	8											
13	14				medium dense	brown	Bottom 1.7': SILT,some Gravel,little F/C Sand					
	24											
14	4	2.0 2.0	S-8	Sandy SILT with Gravel	loose	light brown	SILT,little F/C Sand,little Gravel	ML	dry	None		0.0
	6											
15	10											
	10											
16	9	2.0 2.0	S-9		medium dense	brown	SILT,some Gravel,little F/C Sand		wet			0.2
	13											
17	15											
	16											

18 EOB - 18.0' bgs

TYPE OF DRILLING RIG:	CME 75
METHOD OF ADVANCING BORING:	Hollow-Stem Auger
METHOD OF SOIL SAMPLING:	3" Split-Spoon
METHOD OF ROCK CORING:	NA
GROUNDWATER LEVELS:	NA
OTHER OBSERVATIONS:	
BORING NO.: DSY-SB202	



BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB204
 START DATE: 2/11/2011
 COMPLETION DATE: 2/11/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)			
0	6	1.3 / 2.0	S-1 (DSY- SB204-SO- 0002)	SILTY F/C SAND	medium dense	black	Asphalt Subgrade	SW-SM	dry	None		0.1			
	16			SAND		grey	fine SAND,trace Silt	SP							
1	17														
	13														
2	9	1.0 / 2.0	S-2				SAND, little rounded Gravel	SP	damp			0.5			
	17														
3	17														
	18														
4	7	2.0 / 2.0	S-3	Well-Graded SAND with Gravel			F/C SAND and F/M subangular/subrounded GRAVEL,trace Silt	SW				0.1			
	14														
5	16														
	12														
6	10	1.7 / 2.0	S-4	SAND			fine SAND, little rounded Gravel	SP				0.1			
	14														
7	18														
	20														
8	6	1.2 / 2.0	S-5 (DSY- SB204-SO- 0810)												0.4
	15														
9	21														
	25														

10

TYPE OF DRILLING RIG:	CME 75
METHOD OF ADVANCING BORING:	Hollow-Stem Auger
METHOD OF SOIL SAMPLING:	3" Split-Spoon
METHOD OF ROCK CORING:	NA
GROUNDWATER LEVELS:	NA
OTHER OBSERVATIONS:	Samples DSY-SB204-SO-0002 and DSY-SB204-SO-0810 were collected and analyzed by Empirical Laboratories, LLC for VOCs, GRO/DRO, PAHs, and Metals
BORING NO.: DSY-SB204	
Page 1 of 2	




BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB204
 START DATE: 2/11/2011
 COMPLETION DATE: 2/11/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCCIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)													
10	8	1.5 2.0	S-6	SAND	medium dense	grey	fine SAND,little coarse Sand,little rounded Gravel	SP	wet	None		0.2													
	18																								
11	29																								
	19																								
12	9	1.4 2.0	S-7	Well-Graded SAND with Gravel			F/C SAND and F/C subangular to subrounded Gravel up to 2"	SW						0.5											
	17																								
13	17																								
	15																								
14	4	0.3 2.0	S-8																	0.1					
	20																								
15	29																								
	48																								
16	26	0.8 2.0	S-9		Sandy SILT with Gravel	dense															SILT,some F/C Sand and F/M Gravel,very dense material - Glacial Till,very tight,dense material	ML			0.0
	29																								
17	35																								
	45																								

18

EOB - 18.0' bgs


TYPE OF DRILLING RIG: CME 75 METHOD OF ADVANCING BORING: Hollow-Stem Auger METHOD OF SOIL SAMPLING: 3" Split-Spoon METHOD OF ROCK CORING: NA GROUNDWATER LEVELS: NA OTHER OBSERVATIONS:	
BORING NO.: DSY-SB204	

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: Robin Clark
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB205
 START DATE: 2/15/2011
 COMPLETION DATE: 2/15/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	9	2.0 / 2.0	S-1 (DSY-SB205-SO-0002)	Silty SAND with Gravel	medium dense	grey-brown	F-M SAND SOME SILT AND FINE TO MEDIUM SUBANGULAR TO SUBROUNDED GRAVEL, DRY	SP-SM	dry	None		0.2
	13											
1	15											
	16											
2	12	1.8 / 2.0	S-2	Well-Graded SAND with Gravel			F-C SAND SOME FINE TO MEDIUM ROUNDED GRAVEL, TRACE SILT, DRY	SW				0.1
	12											
3	15											
	16											
4	7	1.8 / 2.0	S-3	SAND - poorly graded	loose	grey-brown	F-M SAND, TRACE TO LITTLE C SAND AND FINE ROUNDED GRAVEL	SP	damp	None		0.3
	7											
5	7											
	9											
6	7	1.5 / 2.0	S-4	Poorly Graded SAND	loose	grey-brown	F-M SAND, TRACE TO LITTLE C SAND AND FINE ROUNDED GRAVEL	SP	damp	None	0.2	
	7											
7	9											
	12											
8	11	0.6 / 2.0	S-5 (DSY-SB205-SO-0809)	Poorly Graded SAND	medium dense	grey-brown	F-M SAND, TRACE TO LITTLE C SAND AND FINE ROUNDED GRAVEL	SP	damp	None	0.2	
	12											
9	13											
	7											

10

TYPE OF DRILLING RIG:	CME 75
METHOD OF ADVANCING BORING:	Hollow-Stem Auger
METHOD OF SOIL SAMPLING:	3" Split-Spoon
METHOD OF ROCK CORING:	NA
GROUNDWATER LEVELS:	NA
OTHER OBSERVATIONS:	Samples DSY-SB205-SO-0002 and DSY-SB205-SO-0809 were collected and analyzed by Empirical Laboratories, LLC for VOCs, GRO/DRO, PAHs, and Metals
BORING NO.: DSY-SB205	
	
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GRD. SURFACE ELEVATION:

NA

CHECKED BY:

16.4

EOB - 16.4' bgs

OTHER OBSERVATIONS:

NA




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BORING LOG FOR: NS Newport - Site 19 - On-Shore Drecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB206
 START DATE: 2/14/2011
 COMPLETION DATE: 2/14/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	8	1.8 2.0	S-1 (DSY-SB206-SO-0002)	ASPHALT/PAVEMENT	medium dense	black	Top 0.4' - ASPHALT	OTHER GP	dry	None		0.0
	11			GRAVEL with minor fine sand and silt			Middle 0.17' - GRAVEL, little F/C SAND, little Silt					
1	9			Well-Graded SAND with Silt		grey	Bottom 1.3' - F/M SAND, little Silt, trace Gravel	SM	damp			
	11											
2	13	2.0 2.0	S-2	Well-Graded SAND with Silt	medium dense	grey	F/M SAND, little Silt, trace Gravel	SM	damp	None		--
	14											
3	19											
	20											
4	10	2.0 2.0	S-3	Well-Graded SAND with Silt	medium dense	grey	F/M SAND, little Silt, trace Gravel	SM	damp	None		0.0
	14											
5	20											
	24											
6	19	2.0 2.0	S-4	Poorly Graded SAND with Gravel	medium dense	grey	F/C SAND, some Gravel, trace Silt	SP	damp	None		0.0
	15											
7	15											
	18											
8	12	2.0 2.0	S-5 (DSY-SB206-SO-0810)	Poorly Graded SAND with Gravel	medium dense	grey	F/C SAND, some Gravel, trace Silt	SP	damp	None		0.1
	14											
9	21											
	23											

10

TYPE OF DRILLING RIG:	CME 75
METHOD OF ADVANCING BORING:	Hollow-Stem Auger
METHOD OF SOIL SAMPLING:	3" Split-Spoon
METHOD OF ROCK CORING:	NA
GROUNDWATER LEVELS:	NA
OTHER OBSERVATIONS:	Samples DSY-SB206-SO-0002 and DSY-SB206-SO-0810 were collected and analyzed by Empirical Laboratories, LLC for VOCs, GRO/DRO, PAHs, and Metals
BORING NO.: DSY-SB206	
 TETRA TECH	
Page 1 of 2	

GRD. SURFACE ELEVATION:

NA

CHECKED BY:

14 EOB - 14.0' bgs

OTHER OBSERVATIONS:

NA




Page 2 of 2

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB207
 START DATE: 2/15/2011
 COMPLETION DATE: 2/15/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)					
0	8	1.8 / 2.0	S-1 (DSY-SB207-SO-0002)	Silty SAND with Gravel	medium dense	grey	F-C SAND,some fine to medium rounded gravel,dry	SM	dry	None		0.1					
	16																
1	17																
	15																
2	11	2.0 / 2.0	S-2	Poorly Graded SAND	medium dense	grey-blue	VERY FINE TO FINE SAND,TRACE SILT	SP	damp	None		0.0					
	10																
3	11																
	12																
4	8	1.6 / 2.0	S-3	SAND - well graded	loose	grey	F-C SAND,trace fine to medium gravel	SW				0.0					
	9																
5	10																
	12																
6	11	2.0 / 2.0	S-4	SAND - well graded	medium dense	grey	F-C SAND,trace shell fragments and fine gravel	SW	damp	None	0.0						
	16																
7	20																
	20																
8	10	2.0 / 2.0	S-5				F-M SAND,trace crs sand and fine rounded gravel,damp				0.1						
	15																
9	16																
	20																

10

TYPE OF DRILLING RIG:	CME 75
METHOD OF ADVANCING BORING:	Hollow-Stem Auger
METHOD OF SOIL SAMPLING:	3" Split-Spoon
METHOD OF ROCK CORING:	NA
GROUNDWATER LEVELS:	NA
OTHER OBSERVATIONS:	Sample DSY-SB207-SO-0002 was collected and analyzed by Empirical Laboratories, LLC for VOCs, GRO/DRO, PAHs, and Metals
BORING NO.: DSY-SB207	
	
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BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB207
 START DATE: 2/15/2011
 COMPLETION DATE: 2/15/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	9	2.0 / 2.0	S-6 (DSY-SB207-SO-1012)	Well-Graded SAND with Gravel	medium dense	grey	0-1.8 ft F-CRS SAND,trace fine to medium rounded gravel.,1.8-2.0 ft medium rounded gravel and m-c sand,wet	SW	wet	None		0.1
	15											
11	18											
	19	1.8 / 2.0	S-7	SANDY GRAVEL		grey-brown	F-C SAND AND SUBANGULAR TO ROUNDED FINE TO MEDIUM GRAVEL,WET. TRACE SILT	GW				0.1
12	10											
	21											
13	31											
	31											
14	EOB - 14.0' bgs											

TYPE OF DRILLING RIG:	CME 75
METHOD OF ADVANCING BORING:	Hollow-Stem Auger
METHOD OF SOIL SAMPLING:	3" Split-Spoon
METHOD OF ROCK CORING:	NA
GROUNDWATER LEVELS:	NA
OTHER OBSERVATIONS:	Sample DSY-SB207-SO-1012 was collected and analyzed by Empirical Laboratories, LLC for VOCs, GRO/DRO, PAHs, and Metals
BORING NO.: DSY-SB207	



BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB218
 START DATE: 2/8/2011
 COMPLETION DATE: 2/8/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)	
0	14	1.0 / 2.0	S-1	Poorly Graded SAND with Silt and Gravel	medium	dark grey	Top 0.5' - F/C SAND,some Silt,little Gravel,trace Asphalt	SP	moist	None		1.4	
	16			SANDY SILT	dense	grey	Bottom 0.5' - SILT,some F/C Sand,little Gravel	ML	damp				
1	11												
	4												
2	4	1.7 / 2.0	S-2	SANDY SILT	loose	grey	SILT,some F/C Sand,little Gravel	ML	damp	None		1.3	
	3												
3	11												
	10												
4	6	1.4 / 2.0	S-3	SANDY SILT	medium dense	grey	SILT,little F/C Sand,little Gravel	ML	dry	None		1.3	
	15												
5	23												
	11												
6	4	1.4 / 2.0	S-4	SANDY SILT	medium dense	grey	SILT,little F/C SAND,little Gravel	ML	dry	None	1.0		
	9												
7	13												
	16												
8	2	1.25 / 2.0	S-5	SANDY SILT	loose	grey	SILT,some F/C Sand,little Gravel	ML	dry	None	1.4		
	5												
9	7												
	6												

10

TYPE OF DRILLING RIG:	CME 75
METHOD OF ADVANCING BORING:	Hollow-Stem Auger
METHOD OF SOIL SAMPLING:	3" Split-Spoon
METHOD OF ROCK CORING:	NA
GROUNDWATER LEVELS:	NA
OTHER OBSERVATIONS:	
BORING NO.: DSY-SB218	



BORING LOG FOR: NS Newport - Site 19 - On-Shore Drecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB218
 START DATE: 2/8/2011
 COMPLETION DATE: 2/8/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)		
10	2	1.6 2.0	S-6	SILT with gravelly/sandy matrix	loose	grey	SILT,little F/C Sand,little Gravel	ML	dry	None		0.8		
	4													
11	6													
	8													
12	10	1.4 2.0	S-7	SHALE	medium dense	grey	WEATHERED PHYLLITE LITTLE FINE SAND AND SUILT	GP	wet	None		0.6		
	13													
13	21													
	10													
14	5	1.6 2.0	S-8	SILTY GRAVEL	loose	grey	GRAVEL ,some Silt,little F/C Sand,trace weathered bedrock	GM	moist	None		0.6		
	5													
15	5													
	6													
16	5	1.6 2.0	S-9	Poorly Graded SAND with Silt and Gravel	loose	grey	F/C SAND,little Silt,little Gravel,trace weathered bedrock	SP	wet	None	0.6			
	4													
17	4													
	5													
18	4	1.4 2.0	S-10	Poorly Graded GRAVEL with Silt and Sand	loose	grey	GRAVEL,some Silt,little F/C Sand	GP	wet	None	0.5			
	2													
19	4													
	8													

20

EOB - 20.0' bgs

TYPE OF DRILLING RIG:	CME 75	 TETRA TECH
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:		
BORING NO.: DSY-SB218		Page 2 of 2

BORING LOG FOR: NS Newport - Site 19 - On-Shore Drecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB219
 START DATE: 2/8/2011
 COMPLETION DATE: 2/8/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)	
0	5	1.8 / 2.0	S-1	Sandy SILT with Gravel	loose	brown	SILT,some f-c Sand,little Gravel	ML	damp	None		0.0	
	8												
1	8												
	16												
2	20	1.0 / 2.0	S-2	Poorly Graded GRAVEL with Silt and Sand	dense	brown	GRAVEL,some Silt,little F/C Sand,trace Asphalt (asphalt in tip)	GP	damp	None		0.3	
	15												
3	50/0												
	--												
4	9	0.2 / 2.0	S-3	SANDY SILT	loose	grey	SILT,some F/C Sand	ML	dry	None		0.7	
	9												
5	8												
	6												
6	6	1.6 / 2.0	S-4	SANDY SILT	loose	grey	SILT,little F/C Sand,trace gravel	ML	dry	None		1.9	
	4												
7	5												
	4												
8	2	1.5 / 2.0	S-5	Gravelly SILT with Sand	loose	grey	SILT,and GRAVEL,little F/C sand,trace wood debris	ML	dry	None		1.0	
	9												
9	10												
	10												

10

TYPE OF DRILLING RIG:	CME 75	 TETRA TECH
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:		
BORING NO.: DSY-SB219		Page 1 of 2

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB219
 START DATE: 2/8/2011
 COMPLETION DATE: 2/8/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)							
10	8	0.0 / 2.0	S-6									No recovery / no sample							
	10																		
11	5																		
	3	0.0 / 2.0	S-7									No recovery / no sample							
12	2																		
	2																		
13	3	0.0 / 2.0	S-7									No recovery / no sample							
	2																		
14	1	0.4 / 2.0	S-8									Silty GRAVEL	loose	grey	GRAVEL,SOME silt and F/C sand	GP	wet	None	0.1
	1																		
15	2																		
	1	0.4 / 2.0	S-8																
16	2	0.2 / 2.0	S-9									SILTY SAND	loose	grey	SAND,some Silt trace gravel	SM	wet	None	0.0
	1																		
17	1																		
	3	0.2 / 2.0	S-9																
18	1	1.2 / 2.0	S-10	Gravelly SILT with Sand	loose	grey	SILT,some gravel,little F/C sand	ML	wet	None	0.6								
	2																		
19	2																		
	3	1.2 / 2.0	S-10																

20

EOB - 20.0' bgs

TYPE OF DRILLING RIG: CME 75 METHOD OF ADVANCING BORING: Hollow-Stem Auger METHOD OF SOIL SAMPLING: 3" Split-Spoon METHOD OF ROCK CORING: NA GROUNDWATER LEVELS: NA OTHER OBSERVATIONS:	
BORING NO.: DSY-SB219	Page 2 of 2

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB220
 START DATE: 2/10/2011
 COMPLETION DATE: 2/10/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	12	1.3 2.0	S-1	Gravelly SILT with Sand	medium dense	dark brown	SILT and subangular to subrounded GRAVEL, up to 1", some F/M Sand	ML	damp			0.1
	16											
1	25											
	33	1.2 2.0	S-2	Well-Graded SAND with Gravel			Very fine to fine SAND, some sub-angular Gravel up to 1", trace of Silt - brick fragment	SW	dry			0.1
2	18											
	15											
3	15	1.6 2.0	S-3		loose					None		0.0
	13											
4	5											
	4	1.7 2.0	S-4	Poorly Graded SAND		grey	Fine SAND, trace Silt	SP	damp			0.1
5	4											
	2											
6	4	1.7 2.0	S-5		very loose				wet			0.3
	3											
7	3											
	2	1.7 2.0										
8	1											
	1											
9	1	1.7 2.0										
	1											
	1											

10

TYPE OF DRILLING RIG: CME 75 METHOD OF ADVANCING BORING: Hollow-Stem Auger METHOD OF SOIL SAMPLING: 3" Split-Spoon METHOD OF ROCK CORING: NA GROUNDWATER LEVELS: NA OTHER OBSERVATIONS:	
BORING NO.: DSY-SB220	
Page 1 of 2	

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB220
 START DATE: 2/10/2011
 COMPLETION DATE: 2/10/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)				
10	1	1.0 / 2.0	S-6	Poorly Graded SAND with Gravel	very loose	grey	Fine SAND,some F/M Gravel rounded,trace of coarse Sand and Silt	SP	wet	None		0.4				
	2															
11	2															
	1															
12	1	1.5 / 2.0	S-7												0.1	
	1															
13	1															
	1															
14	2	1.0 / 2.0	S-8	Well-Graded SAND with Gravel	loose			F/M SAND and F/M rounded GRAVEL,some coarse Sand,trace Silt				SW				0.0
	6															
15	4															
	2															
16	2	1.2 / 2.0	S-9					Top 1.6' - F/M SAND and F/M rounded GRAVEL,some coarse Sand,trace Silt								0.0
	2															
17	2															
	2															
18	1	0.8 / 2.0	S-10	SILT	very loose		Bottom 0.4' - SILT	ML							0.3	
	1						Top 0.6' - SILT									
19	1			Poorly Graded SAND				black	Bottom 1.4' - Fine SAND	SP						
	1															

20

EOB - 20.0' bgs

TYPE OF DRILLING RIG:	CME 75
METHOD OF ADVANCING BORING:	Hollow-Stem Auger
METHOD OF SOIL SAMPLING:	3" Split-Spoon
METHOD OF ROCK CORING:	NA
GROUNDWATER LEVELS:	NA
OTHER OBSERVATIONS:	
BORING NO.: DSY-SB220	



BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB221
 START DATE: 2/14/2011
 COMPLETION DATE: 2/14/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	8	1.7 / 2.0	S-1	ASPHALT/PAVEMENT	loose	black	(Used augers to get through asphalt)	OTHER	dry	None		0.8
	7			Silty SAND with Gravel		dark grey	F/C SAND, little Silt, little Gravel	SM	damp			
1	7											
	5											
2	4	1.8 / 2.0	S-2	Silty SAND with Gravel	very loose	dark grey	F/C SAND, little Silt, little Gravel	SM	damp	None		0.7
	3											
3	3											
	2											
4	2	1.0 / 2.0	S-3	Poorly Graded SAND with Gravel		grey	VF-F SAND, some rounded fine gravel, some silt, damp	SP				0.2
	2											
5	3											
	3											
6	3	1.0 / 2.0	S-4	Poorly Graded SAND	very loose	dark orange	rusty brown F-M SAND, trace silt, wet	SP	wet	None	0.0	
	3											
7	3											
	3											
8	1	1.2 / 2.0	S-5	Silty SAND with Gravel	very loose	grey	F-M SAND, some rounded fine gravel, and silt, wet	SM	wet	None	0.0	
	2											
9	1											
	1											

10


TYPE OF DRILLING RIG:	CME 75
METHOD OF ADVANCING BORING:	Hollow-Stem Auger
METHOD OF SOIL SAMPLING:	3" Split-Spoon
METHOD OF ROCK CORING:	NA
GROUNDWATER LEVELS:	NA
OTHER OBSERVATIONS:	
BORING NO.: DSY-SB221	



BORING LOG FOR: NS Newport - Site 19 - On-Shore Drecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB221
 START DATE: 2/14/2011
 COMPLETION DATE: 2/14/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	1	1.8 2.0	S-6	Silty SAND with Gravel	very loose	grey	F-M SAND,some rounded fine gravel,and silt,wet	SP	wet	None		0.1
	1											
11	4											
	5											
12	7	1.0 2.0	S-7	Silty SAND with Gravel	loose	grey	F-M SAND,some rounded fine gravel,and silt,wet	SP	wet	None		0.2
	9											
13	10											
	12											
14	4	1.3 2.0	S-8	Silty SAND with Gravel	medium dense	grey	0-1.0 FT FINE SAND,trace silt,wet. 1.0-1.3 SILTY GRAVEL,sime fine sand,wet.	SM	wet	None		0.1
	6											
15	16											
	21											
16	EOB - 16.0' bgs											


TYPE OF DRILLING RIG:	CME 75	 TETRA TECH
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:		
BORING NO.: DSY-SB221		Page 2 of 2

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: Robin Clark
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB222
 START DATE: 2/16/2011
 COMPLETION DATE: 2/16/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)	
0	6	1.5 / 2.0	S-1	Well-Graded SAND with Silt and Gravel	medium dense	grey	FINE TO MEDIUM SAND,SOME SILT AND FINE ROUNDED GRAVEL,DRY	SP-SM	dry	None		3.7	
	9												
1	24												
	17												
2	13	1.3 / 2.0	S-2	Well-Graded SAND with Gravel	loose	grey	FINE TO COARSE SAND SOME FINE TO MEDIUM SUBROUNDED TO SUBANGULAR GRAVEL,DRY	SP-SM	dry	None		0.6	
	11												
3	8												
	7												
4	8	1.5 / 2.0	S-3	Well-Graded SAND with Gravel	loose	grey	FINE TO MEDIUM SAND,SOME FINE TO MEDIUM ROUNDED TO ANGULAR GRAVEL AND COARSE SAND,DAMP	SW	damp	None		0.3	
	10												
5	9												
	8												
6	3	0.7 / 2.0	S-4	Poorly Graded SAND	loose	grey-blue	FINE TO MEDIUM SAND,WET	SP	wet	None	0.5		
	4												
7	5												
	4												
8	1	1.3 / 2.0	S-5	Poorly Graded SAND	very loose	grey	FINE TO MEDIUM SAND,WET	SP	wet	None	0.7		
	1												
9	1												
	1												

10

TYPE OF DRILLING RIG:	CME 75	 TETRA TECH
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:		
BORING NO.: DSY-SB222		Page 1 of 3

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: Robin Clark
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB222
 START DATE: 2/16/2011
 COMPLETION DATE: 2/16/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
10	1	1.0 2.0	S-6	Poorly Graded SAND	very loose	grey	FINE TO MEDIUM SAND,WET	SP	wet	None		1.2
	1											
11	2											
	1	2.0 2.0	S-7	Poorly Graded SAND	medium dense	grey	0-1.5 FT SAME AS ABOVE,1.5-2.0 FT PLATY FINE TO MEDIUM GRAVEL,SOME SILT AND FINE TO MEDIUM SAND,WET	SP	wet	None		1.9
12	9											
	19											
13	22	1.0 2.0	S-8	SILT with gravelly/sandy matrix			SILT,SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL,TILL	ML	damp			0.6
	10											
15	15											
	15	1.0 2.0	S-9	SILT with gravelly/sandy matrix	medium dense	grey	SILT,SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL,TILL	ML	damp	None		0.4
16	21											
	27											
17	31	0.7 2.0	S-10	SILT with gravelly/sandy matrix	medium dense	grey	SILT,SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL,TILL	ML	damp	None		1.1
	35											
18	6											
	11											
19	13											
	16											

20


TYPE OF DRILLING RIG:	CME 75
METHOD OF ADVANCING BORING:	Hollow-Stem Auger
METHOD OF SOIL SAMPLING:	3" Split-Spoon
METHOD OF ROCK CORING:	NA
GROUNDWATER LEVELS:	NA
OTHER OBSERVATIONS:	
BORING NO.: DSY-SB222	



BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: Robin Clark
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB222
 START DATE: 2/16/2011
 COMPLETION DATE: 2/16/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)	
20	5	0.8 2.0	S-11	SILT with gravelly/sandy matrix	loose	grey	SILT,SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL,TILL	ML	damp	None		0.8	
	6												
21	10												
	16												
22	20	1.0 2.0	S-12	SILT with gravelly/sandy matrix	dense	grey	SILT,SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL,TILL	ML	damp	None		0.9	
	22												
23	48												
	65												
24	75	1.0 2.0	S-13	SILT with gravelly/sandy matrix	very dense	grey	SILT,SOME FINE TO MEDIUM SAND LITTLE FINE ROUNDED TO ANGULAR GRAVEL,TILL	ML	dry	None		1.0	
	120/5												
25	--												
	--												
26	EOB - 26.0' bgs												

TYPE OF DRILLING RIG: CME 75 METHOD OF ADVANCING BORING: Hollow-Stem Auger METHOD OF SOIL SAMPLING: 3" Split-Spoon METHOD OF ROCK CORING: NA GROUNDWATER LEVELS: NA OTHER OBSERVATIONS:	
BORING NO.: DSY-SB222	Page 3 of 3

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecoctor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB223
 START DATE: 2/10/2011
 COMPLETION DATE: 3/4/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
0	9	1.0 / 2.0	S-1	GRAVELLY SAND	medium dense	dark brown	F/C SAND and platy GRAVEL	SW	dry	None		0.2
	6											
1	5											
	4	1.0 / 2.0	S-2	SILTY GRAVEL		grey	platy GRAVEL,some Silt	GM				0.2
2	2											
	4											
3	3	0.6 / 2.0	S-3	SILT with Gravel		dark brown	SILT,little rounded Gravel up to 1"	SW-SM				0.2
	9											
4	2											
	8	1.5 / 2.0	S-4	Sandy SILT with Gravel		grey	SILT,some very fine Sand,platy Gravel up to 1"	ML				0.2
5	4											
	6											
6	3	1.8 / 2.0	S-5				SILT,little Sand,Gravel up to 1"					0.3
	4											
7	9											
	6											
8	7											
	7											
9	9											
	8											

10

TYPE OF DRILLING RIG:	CME 75	 TETRA TECH
METHOD OF ADVANCING BORING:	Hollow-Stem Auger and Air Hammer	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:		
BORING NO.: DSY-SB223		Page 1 of 6

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB223
 START DATE: 2/10/2011
 COMPLETION DATE: 3/4/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)					
10	6	1.5 / 2.0	S-6	Sandy SILT with Gravel	medium dense	grey	SILT,little Sand,Gravel up to 1"	ML	dry	None		0.3					
	10																
11	12																
	14																
12	16	0.4 / 2.0	S-7		dense												0.1
	21																
13	21																
	24																
14	13	1.7 / 2.0	S-8														0.2
	21																
15	23																
	27																
16	18	1.9 / 2.0	S-9	very dense							0.1						
	25																
17	22																
	29																
18	13	1.4 / 2.0	S-10									0.1					
	27																
19	31																
	32																

20

TYPE OF DRILLING RIG: CME 75 METHOD OF ADVANCING BORING: Hollow-Stem Auger and Air Hammer METHOD OF SOIL SAMPLING: 3" Split-Spoon METHOD OF ROCK CORING: NA GROUNDWATER LEVELS: NA OTHER OBSERVATIONS:	
BORING NO.: DSY-SB223	Page 2 of 6

BORING LOG FOR: NS Newport - Site 19 - On-Shore Drecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB223
 START DATE: 2/10/2011
 COMPLETION DATE: 3/4/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)		
20	31	2.0 / 2.0	S-11	Sandy SILT with Gravel	very dense	grey	SILT,little Sand,Gravel up to 1"	ML	dry	None		0.3		
	40													
21	57													
	61													
22	25	1.9 / 2.0	S-12									SILT,little Sand,Gravel up to 1"	ML	0.1
	38													
23	38													
	50													
24	12	2.0 / 2.0	S-13				Weathered Bedrock - Phyllite	ROCK						
	15													
25	17													
	47													
26	30	2.0 / 2.0	S-14	SHALE	dense	1.5								
	24													
27	27													
	25													
28	19	2.0 / 2.0	S-15	BEDROCK	medium dense	grey- brown	1.5							
	25													
29	22													
	21													

30

TYPE OF DRILLING RIG: CME 75 METHOD OF ADVANCING BORING: Hollow-Stem Auger and Air Hammer METHOD OF SOIL SAMPLING: 3" Split-Spoon METHOD OF ROCK CORING: NA GROUNDWATER LEVELS: NA OTHER OBSERVATIONS:	
BORING NO.: DSY-SB223	Page 3 of 6

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB223
 START DATE: 2/10/2011
 COMPLETION DATE: 3/4/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
30		NA 5.0	S-16	BEDROCK	medium dense	grey- brown	Weathered Bedrock - Phyllite	ROCK	wet	None	Brown water coming up from cuttings. Air hammer advancement indicates very weathered rock,soft rock cuttings,little competant rock cuttings,no odor or sheen observed	--
31												
32												
33												
34												
35		NA 5.0	S-17		dense	dark grey	Phyllite				Gray water coming up from cuttings. Air hammer advancement indicates weathered rock,some competant rock cuttings,no odor or sheen observed	--
36												
37												
38												
39												

40

TYPE OF DRILLING RIG:	CME 75	 TETRA TECH
METHOD OF ADVANCING BORING:	Hollow-Stem Auger and Air Hammer	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:		
BORING NO.: DSY-SB223		Page 4 of 6

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB223
 START DATE: 2/10/2011
 COMPLETION DATE: 3/4/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
40		NA 2.0	S-18									--
41												
42												
43		3.75 5.0	S-19	BEDROCK	medium dense	grey	Slightly Weathered Phyllite	ROCK	wet	None	Horizontal Fractures at 42.75', 43.25', 45' with little rust oxidized staining - RQD = 0.27	--
44												
45												
46												
47												
48		NA 3.0	S-20		dense		Phyllite				Horizontal Fractures at 48.2', 50.87' with little rust oxidized staining - RQD = 0.37	--
49												
50												

TYPE OF DRILLING RIG:	CME 75	 TETRA TECH
METHOD OF ADVANCING BORING:	Hollow-Stem Auger and Air Hammer	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:		


BORING NO.: DSY-SB223

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SB223
 START DATE: 2/10/2011
 COMPLETION DATE: 3/4/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)
50		NA 2.0	S-20 (cont)	BEDROCK	dense	grey	Phyllite	ROCK	Wet	None	Horizontal Fractures at 48.2', 50.87' with little rust oxidized staining - RQD = 0.37	--
51												
52												

EOB - 52.0' bgs

TYPE OF DRILLING RIG:	CME 75	 TETRA TECH
METHOD OF ADVANCING BORING:	Hollow-Stem Auger and Air Hammer	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:		
BORING NO.: DSY-SB223		Page 6 of 6

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SBMW02A
 START DATE: 2/9/2011
 COMPLETION DATE: 2/9/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)	
0	25	2.0 / 2.0	S-1	ASPHALT/PAVEMENT	dense	dark grey	ASPHALT	OTHER	dry	None		--	
	49			Silty GRAVEL with Sand			GRAVEL,some Silt,little F/C Sand	GM					
1	20			SILTY SAND		medium dense	grey	F/M SAND,little Silt and Cobbles - Cobbles shattered					SM
	26							F/M SAND,little Silt,trace Gravel					
2	18	2.0 / 2.0	S-2	SILTY SAND	medium dense	grey	F/M SAND,little Silt,trace Gravel	SM	dry	None		--	
	13												
3	15												
	12												
4	12	0.0 / 2.0	S-3									--	
	15												
5	16												
	13												
6	12	1.0 / 2.0	S-4	SILTY SAND	medium dense	grey	F/M SAND,little Silt - crushed cobble @ 6'-8' interval and broken shells @ 8'-18' interval	SM	dry	None	--		
	11												
7	11												
	9												
8	6	1.4 / 2.0	S-5	SILTY SAND	loose			SP	wet		--		
	5												
9	3												
	4												

10

TYPE OF DRILLING RIG:	CME 75	 TETRA TECH
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:		
BORING NO.: DSY-SBMW02A		Page 1 of 3

BORING LOG FOR: NS Newport - Site 19 - On-Shore Drecktor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SBMW02A
 START DATE: 2/9/2011
 COMPLETION DATE: 2/9/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)																											
10	2	1.4 2.0	S-6	SILTY SAND	loose	grey	F/M SAND, little Silt - broken shells	SP	wet	None		--																											
	4																																						
11	6																																						
	2																																						
12	2	2.0 2.0	S-7		very loose													--																					
	3																																						
13	2																																						
	3																																						
14	1	2.0 2.0	S-8																		Top 1.6' - F/C SAND, little Silt				--														
	1																																						
15	1																																						
	1																																						
16	2	2.0 2.0	S-9																													--							
	2																																						
17	2																																						
	2																																						
18	1	2.0 2.0	S-10																																Bottom 0.6' - F/C SAND, little Silt				--
	1																																						
19	1																																						
	4																																						


20

TYPE OF DRILLING RIG: CME 75 METHOD OF ADVANCING BORING: Hollow-Stem Auger METHOD OF SOIL SAMPLING: 3" Split-Spoon METHOD OF ROCK CORING: NA GROUNDWATER LEVELS: NA OTHER OBSERVATIONS:	
BORING NO.: DSY-SBMW02A	Page 2 of 3

BORING LOG FOR: NS Newport - Site 19 - On-Shore Derecoctor Shipyard
 PROJECT NO.: 112G02125.SA.DM
 LOGGED BY: M. Alroy
 DRILLED BY (Company/Driller): Technical Drilling Services/Gary
 GRD. SURFACE ELEVATION: NA

BORING NO.: DSY-SBMW02A
 START DATE: 2/9/2011
 COMPLETION DATE: 2/9/2011
 MON. WELL NO.: NA
 CHECKED BY:

DEPTH (FEET)	BLOWS PER 6"	SAMPLE REC. / SAMP LENG.	SAMPLE NUMBER (LAB SAMPLE ID)	DEPTH MAT'L CHG / WELL PROF'L	SOIL DENSITY/C OCSIS. or ROCK HARD.	COLOR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	MOIST.	ODOR	REMARKS (geological classification; rock weathering; etc.)	PID SCREENING RESULT (ppm)		
20	1	2.0	2.0	S-11	loose	grey	Top 1' - F/C SAND,little Silt	SP	wet	None		--		
	4													
21	8					dark grey	bottom 1' - F/C SAND,-little Silt			Organic - slight				
	7													
22	5	2.0	2.0			S-12	loose			grey		Top 0.7' - F/C SAND,little Silt	None	--
	10									black		Middle 0.3' - F/C SAND,little Silt	Odor - slight	
23	9			grey	Bottom 1' - F/C SAND,little Silt			None						
	11													
24	12	2.0	2.0	S-13	medium dense			grey mottling	Top 1.6' - F/C SAND,little Silt	GM	wet	Organic - slight		--
	22													
25	23													
	26	grey	Bottom 0.4' - GRAVEL,little F/C Sand,little Silt											
				Poorly Graded GRAVEL with Silt and Sand										
26				EOB - 26.0' bgs										

TYPE OF DRILLING RIG:	CME 75	
METHOD OF ADVANCING BORING:	Hollow-Stem Auger	
METHOD OF SOIL SAMPLING:	3" Split-Spoon	
METHOD OF ROCK CORING:	NA	
GROUNDWATER LEVELS:	NA	
OTHER OBSERVATIONS:		
BORING NO.: DSY-SBMW02A		Page 3 of 3

B-2 WELL CONSTRUCTION LOGS



Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEETBORING NO. DSY-MW02A

PROJECT:	<u>Newport NS</u>	DRILLING Co.:	<u>Technical Drilling Svcs</u>	BORING No.:	<u>DSY-MW02A</u>
PROJECT No.:	<u>112G02125</u>	DRILLER:	<u>Gary Caouette</u>	DATE COMPLETED	<u>2/9/2011</u>
SITE:	<u>19</u>	DRILLING METHOD	<u>Hollow-Stem Auger</u>	NORTHING:	<u>161948.18</u>
GEOLOGIST:	<u>Miki Alroy</u>	DEV. METHOD:	<u>Wattera inertial lift pump</u>	EASTING:	<u>379410.29</u>

	ELEVATION OF TOP OF SURFACE CASING:	
	STICK -UP TOP OF SURFACE CASING:	
	ELEVATION OF TOP OF RISER PIPE:	
	RISER STICK-UP ABOVE GROUND SURFACE:	
	I.D. OF SURFACE CASING:	<u>6"</u>
	TYPE OF SURFACE CASING:	<u>Stand Pipe</u>
	GROUND ELEVATION (NGVD 29):	<u>10.1'</u>
	TYPE OF SURFACE SEAL:	<u>Concrete</u>
	RISER PIPE I.D.:	<u>2"</u>
	TYPE OF RISER PIPE:	<u>Schedule 40 PVC</u>
	BOREHOLE DIAMETER:	<u>8"</u>
	TYPE OF SEAL:	<u>Cement / Bentonite Grout</u>
	ELEVATION / DEPTH OF SEAL:	<u>/ 12'</u>
	TYPE OF SEAL:	<u>100% Bentonite</u>
	ELEVATION / DEPTH TOP OF FILTER PACK:	<u>/ 14'</u>
ELEVATION / DEPTH TOP OF SCREEN:	<u>/ 16'</u>	
TYPE OF SCREEN:	<u>2" Sch. 40 Slot PVC</u>	
SLOT SIZE X LENGTH:	<u>0.010" x 10'</u>	
I.D. OF SCREEN:	<u>2"</u>	
TYPE OF FILTER PACK:	<u>#1 Silica Sand</u>	
ELEVATION / DEPTH BOTTOM OF SCREEN:	<u>/ 26'</u>	
ELEVATION / DEPTH BOTTOM OF FILTER PACK:	<u>/ 26'</u>	
TYPE OF BACKFILL BELOW		
WELL:	<u>NA</u>	
ELEVATION / DEPTH OF BOREHOLE:	<u>/ 26'</u>	

Footnotes:

NA - Not Applicable

NGVD 29 - NATIONAL GEODETIC VERTICAL DATUM 1929

Coordinate system - NAD 1983 SPCS Rhode Island (Feet)

**MONITORING WELL SHEET**

PROJECT:	<u>Newport NS</u>	DRILLING Co.:	<u>Technical Drilling Services</u>	BORING No.:	<u>DSY-MW204</u>
PROJECT No.:	<u>112G02125</u>	DRILLER:	<u>Gary Caouette</u>	DATE COMPLETE:	<u>2/9/2011</u>
SITE:	<u>19</u>	DRILLING METHO	<u>Hollow-Stem Auger</u>	NORTHING:	<u>161829.245</u>
GEOLOGIST:	<u>Miki Alroy</u>	DEV. METHOD:	<u>Wattera inertial lift pump</u>	EASTING:	<u>379641.08</u>

	Elevation / Depth of Top of Riser:	<u>/</u>
	Elevation / Height of Top of Surface Casing:	<u>/</u>
	I.D. of Surface Casing:	<u>4"</u>
	Type of Surface Casing:	<u>Flush Mount Road Box</u>
	Type of Surface Seal:	<u>Concrete</u>
	I.D. of Riser:	<u>2"</u>
	Type of Riser:	<u>2" Schedule 40 PVC</u>
	Borehole Diameter:	<u>8"</u>
	Elevation / Depth Top of Rock:	<u>/ NA</u>
	Type of Backfill:	<u>Grout/Bentonite Slurry</u>
	Elevation / Depth of Seal:	<u>/ 4'</u>
	Type of Seal:	<u>Grout/Bentonite Slurry</u>
	Elevation / Depth of Top of Filter Pack:	<u>/ 6'</u>
	Elevation / Depth of Top of Screen:	<u>/ 8'</u>
	Type of Screen:	<u>2" Schedule 40 Slotted PVC</u>
Slot Size x Length:	<u>0.010" x 10'</u>	
I.D. of Screen:	<u>2"</u>	
Type of Filter Pack:	<u>#1 Silica Sand</u>	
Elevation / Depth of Bottom of Screen:	<u>/ 18'</u>	
Elevation / Depth of Bottom of Filter Pack:	<u>/ 18'</u>	
Type of Backfill Below Well:	<u>NA</u>	
Elevation / Total Depth of Borehole:	<u>/ 18'</u>	

Footnotes:

NA - Not Applicable

NGVD 29 - NATIONAL GEODETIC VERTICAL DATUM 1929

Coordinate system - NAD 1983 SPCS Rhode Island (Feet)



Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEETBORING NO. DSY-MW218

PROJECT:	<u>Newport NS</u>	DRILLING Co.:	<u>Technical Drilling Svcs</u>	BORING No.:	<u>DSY-MW218</u>
PROJECT No.:	<u>112G02125</u>	DRILLER:	<u>Gary Caouette</u>	DATE COMPLETED	<u>2/8/2011</u>
SITE:	<u>19</u>	DRILLING METHOD	<u>Hollow-Stem Auger</u>	NORTHING:	<u>161532.94</u>
GEOLOGIST:	<u>Miki Alroy</u>	DEV. METHOD:	<u>Wattera inertial lift pump</u>	EASTING:	<u>379578.01</u>

	ELEVATION OF TOP OF SURFACE CASING:	
	STICK -UP TOP OF SURFACE CASING:	
	ELEVATION OF TOP OF RISER PIPE:	
	RISER STICK-UP ABOVE GROUND SURFACE:	
	I.D. OF SURFACE CASING:	<u>6"</u>
	TYPE OF SURFACE CASING:	<u>Stand Pipe</u>
	GROUND ELEVATION (NGVD 29):	<u>14'</u>
	TYPE OF SURFACE SEAL:	<u>Concrete</u>
	RISER PIPE I.D.:	<u>2"</u>
	TYPE OF RISER PIPE:	<u>Schedule 40 PVC</u>
	BOREHOLE DIAMETER:	<u>8"</u>
	TYPE OF SEAL:	<u>Cement / Bentonite Grout</u>
	ELEVATION / DEPTH OF SEAL:	<u>/ 6'</u>
	TYPE OF SEAL:	<u>100% Bentonite</u>
	ELEVATION / DEPTH TOP OF FILTER PACK:	<u>/ 8'</u>
ELEVATION / DEPTH TOP OF SCREEN:	<u>/ 10'</u>	
TYPE OF SCREEN:	<u>2" Sch. 40 Slot PVC</u>	
SLOT SIZE X LENGTH:	<u>0.010" x 10'</u>	
I.D. OF SCREEN:	<u>2"</u>	
TYPE OF FILTER PACK:	<u>#1 Silica Sand</u>	
ELEVATION / DEPTH BOTTOM OF SCREEN:	<u>/ 20'</u>	
ELEVATION / DEPTH BOTTOM OF FILTER PACK:	<u>/ 20'</u>	
TYPE OF BACKFILL BELOW		
WELL:	<u>NA</u>	
ELEVATION / DEPTH OF BOREHOLE:	<u>/ 20'</u>	

Footnotes:

NA - Not Applicable

NGVD 29 - NATIONAL GEODETIC VERTICAL DATUM 1929

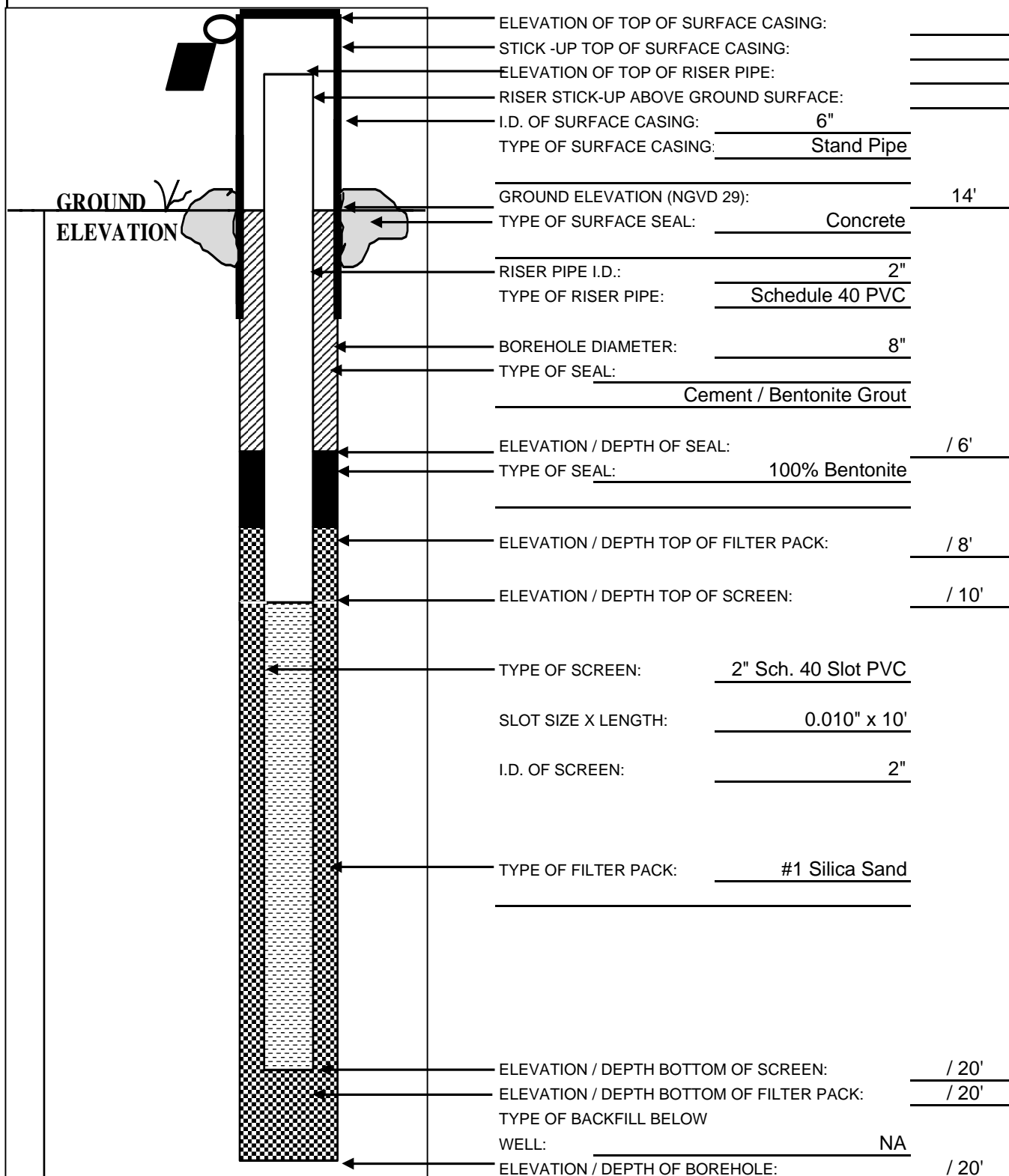
Coordinate system - NAD 1983 SPCS Rhode Island (Feet)



Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEETBORING NO. DSY-MW219

PROJECT:	<u>Newport NS</u>	DRILLING Co.:	<u>Technical Drilling Svcs</u>	BORING No.:	<u>DSY-MW219</u>
PROJECT No.:	<u>112G02125</u>	DRILLER:	<u>Gary Caouette</u>	DATE COMPLETED	<u>2/8/2011</u>
SITE:	<u>19</u>	DRILLING METHOD	<u>Hollow-Stem Auger</u>	NORTHING:	<u>161155.96</u>
GEOLOGIST:	<u>Miki Alroy</u>	DEV. METHOD:	<u>Wattera inertial lift pump</u>	EASTING:	<u>379641.90</u>

**Footnotes:**

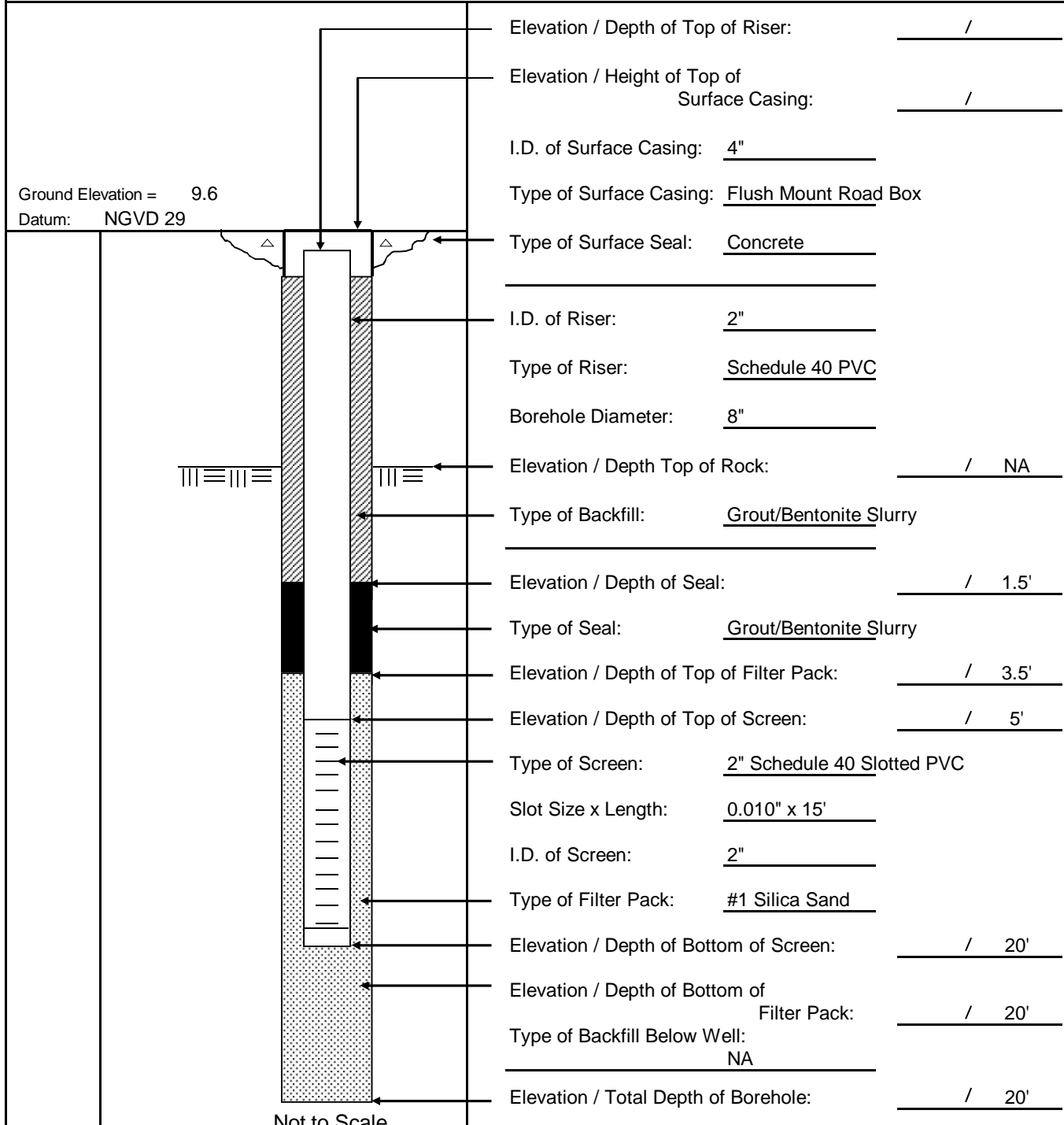
NA - Not Applicable

NGVD 29 - NATIONAL GEODETIC VERTICAL DATUM 1929

Coordinate system - NAD 1983 SPCS Rhode Island (Feet)

**MONITORING WELL SHEET**

PROJECT:	<u>Newport NS</u>	DRILLING Co.:	<u>Technical Drilling Services</u>	BORING No.:	<u>DSY-MW220</u>
PROJECT No.:	<u>112G02125</u>	DRILLER:	<u>Gary Caouette</u>	DATE COMPLETE:	<u>2/10/2011</u>
SITE:	<u>19</u>	DRILLING METHO	<u>Hollow-Stem Auger</u>	NORTHING:	<u>162294.825</u>
GEOLOGIST:	<u>Miki Alroy</u>	DEV. METHOD:	<u>Wattera inertial lift pump</u>	EASTING:	<u>379304.622</u>

**Footnotes:**

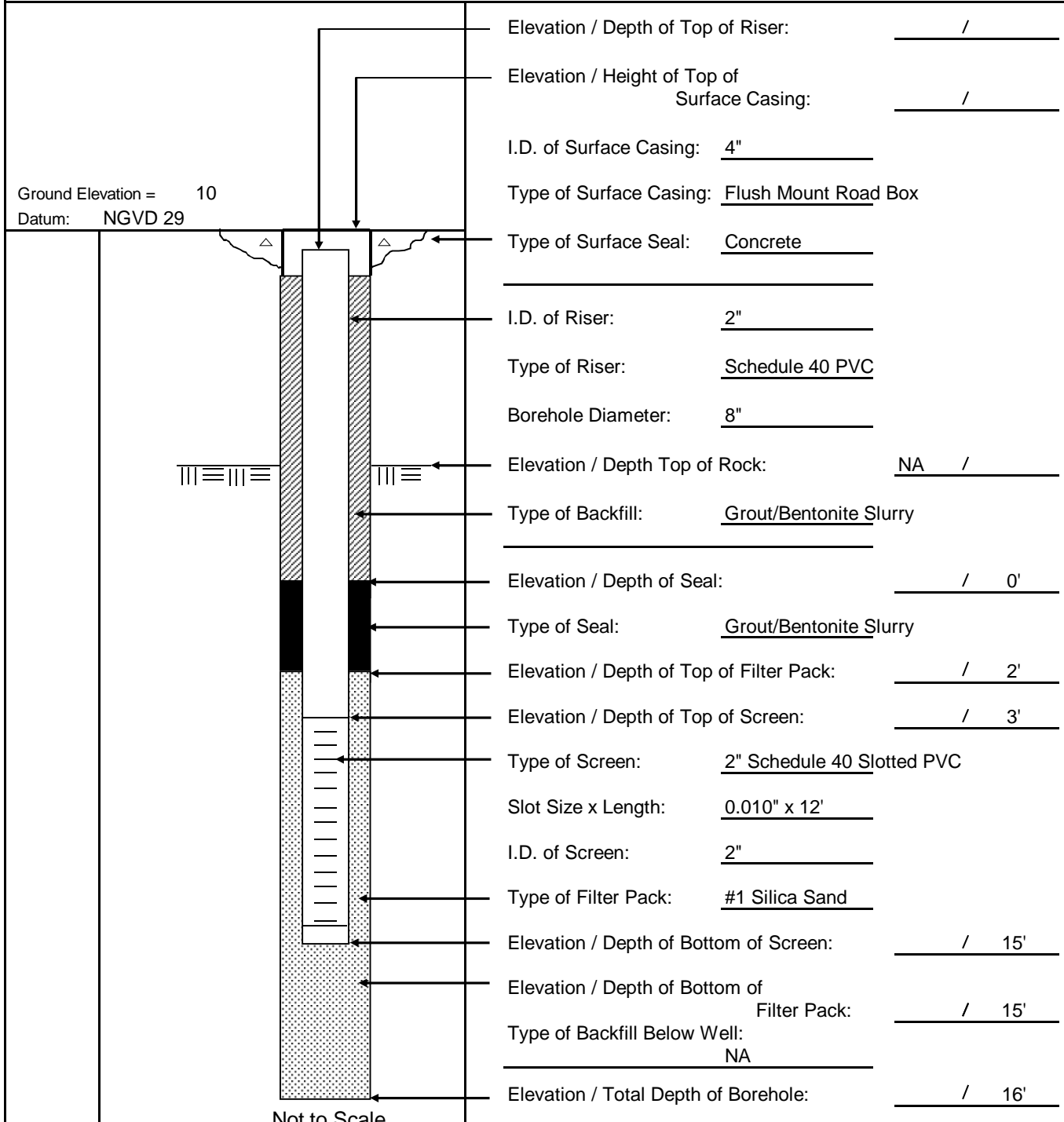
NA - Not Applicable

NGVD 29 - NATIONAL GEODETIC VERTICAL DATUM 1929

Coordinate system - NAD 1983 SPCS Rhode Island (Feet)

**MONITORING WELL SHEET**

PROJECT:	<u>Newport NS</u>	DRILLING Co.:	<u>Technical Drilling Services</u>	BORING No.:	<u>DSY-MW221</u>
PROJECT No.:	<u>112G02125</u>	DRILLER:	<u>Gary Caouette</u>	DATE COMPLETE:	<u>2/14/2011</u>
SITE:	<u>19</u>	DRILLING METHO	<u>Hollow-Stem Auger</u>	NORTHING:	<u>162439.068</u>
GEOLOGIST:	<u>Miki Alroy</u>	DEV. METHOD:	<u>Wattera inertial lift pump</u>	EASTING:	<u>379372.542</u>

**Footnotes:**

NA - Not Applicable

NGVD 29 - NATIONAL GEODETIC VERTICAL DATUM 1929

Coordinate system - NAD 1983 SPCS Rhode Island (Feet)

**MONITORING WELL SHEET**

PROJECT:	<u>Newport NS</u>	DRILLING Co.:	<u>Technical Drilling Services</u>	BORING No.:	<u>DSY-MW222</u>
PROJECT No.:	<u>112G02125</u>	DRILLER:	<u>Gary Caouette</u>	DATE COMPLETE:	<u>3/16/2011</u>
SITE:	<u>19</u>	DRILLING METHO	<u>Hollow-Stem Auger</u>	NORTHING:	<u>162645.67</u>
GEOLOGIST:	<u>Miki Alroy</u>	DEV. METHOD:	<u>Wattera inertial lift pump</u>	EASTING:	<u>379356.391</u>

	Elevation / Depth of Top of Riser:	<u>/</u>
	Elevation / Height of Top of Surface Casing:	<u>/</u>
	I.D. of Surface Casing:	<u>4"</u>
	Type of Surface Casing:	<u>Flush Mount Road Box</u>
	Type of Surface Seal:	<u>Concrete</u>
	I.D. of Riser:	<u>2"</u>
	Type of Riser:	<u>Schedule 40 PVC</u>
	Borehole Diameter:	<u>8"</u>
	Elevation / Depth Top of Rock:	<u>NA /</u>
	Type of Backfill:	<u>Grout/Bentonite Slurry</u>
	Elevation / Depth of Seal:	<u>/ 0'</u>
	Type of Seal:	<u>Grout/Bentonite Slurry</u>
	Elevation / Depth of Top of Filter Pack:	<u>/ 3'</u>
	Elevation / Depth of Top of Screen:	<u>/ 4'</u>
	Type of Screen:	<u>2" Schedule 40 Slotted PVC</u>
Slot Size x Length:	<u>0.010" x 10'</u>	
I.D. of Screen:	<u>2"</u>	
Type of Filter Pack:	<u>#1 Silica Sand</u>	
Elevation / Depth of Bottom of Screen:	<u>/ 14'</u>	
Elevation / Depth of Bottom of Filter Pack:	<u>/ 14'</u>	
Type of Backfill Below Well:	<u>NA</u>	
Elevation / Total Depth of Borehole:	<u>/ 14'</u>	

Footnotes:

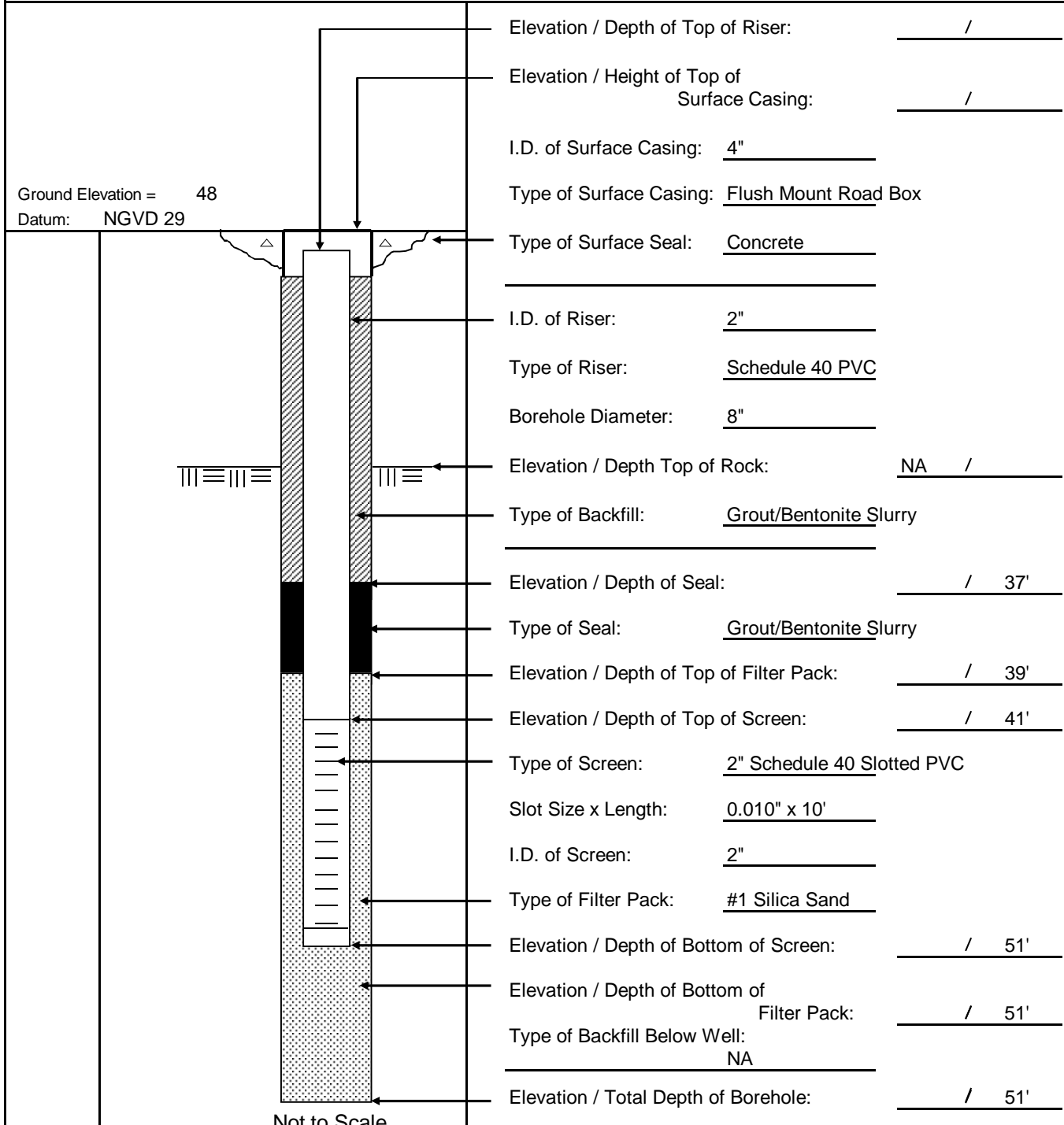
NA - Not Applicable

NGVD 29 - NATIONAL GEODETIC VERTICAL DATUM 1929

Coordinate system - NAD 1983 SPCS Rhode Island (Feet)

**MONITORING WELL SHEET**

PROJECT:	<u>Newport NS</u>	DRILLING Co.:	<u>Technical Drilling Services</u>	BORING No.:	<u>DSY-MW223</u>
PROJECT No.:	<u>112G02125</u>	DRILLER:	<u>Gary Caouette</u>	DATE COMPLETE:	<u>3/4/2011</u>
SITE:	<u>19</u>	DRILLING METHO:	<u>Hollow-Stem Auger</u>	NORTHING:	<u>162730.395</u>
GEOLOGIST:	<u>Miki Alroy</u>	DEV. METHOD:	<u>Wattera inertial lift pump</u>	EASTING:	<u>379643.815</u>

**Footnotes:**

NA - Not Applicable

NGVD 29 - NATIONAL GEODETIC VERTICAL DATUM 1929

Coordinate system - NAD 1983 SPCS Rhode Island (Feet)

APPENDIX C
FIELD MODIFICATION RECORDS



TETRA TECH NUS, INC.

FIELD MODIFICATION RECORD

001

Site Name: On-Shore Dredger Location: NAUSTA Newport

Project Number: 112602125 Task Assignment: Fl. WI

To: _____ Location: _____ Date: _____

Description: Adjustment of monitoring well locations MW-220, MW-221, MW-222 and MW-11. Original proposed locations were determined not to be feasible in the field

Reason for Change: Locations MW-220, MW-221, and MW-222, and MW-11 had to be adjusted because of on going waterfront construction project

Recommended Action: Re-locate monitoring well locations MW-221 and MW-222 to west edge of access road. Re-locate MW-220 south away from active construction zone

Field Operations Leader (Signature): _____ Date: _____

Disposition/Action: Monitoring well locations to be adjusted to positions determined Feasible by FOL and reviewed by Navy and regulators

Project Manager (Signature): _____ Date: _____

Distribution:	Program Manager:	_____	Others as Required:
	Project Manager:	_____	_____
	Quality Assurance Officer:	_____	_____
	Field Operations Leader:	_____	_____
	Project File:	_____	_____



TETRA TECH NUS, INC.

FIELD MODIFICATION RECORD

002

Site Name: On-Shore Dredger Location: NAUSTA Newport

Project Number: 112602125 Task Assignment: FI, WI

To: _____ Location: _____ Date: _____

Description: Up gradient ground water monitoring well location installed in bedrock aquifer

Reason for Change: Overburden groundwater was not encountered during installation of monitoring well location MW-223. Aquifer is considered to be interconnected with overburden aquifer in northern waterfront area.

Recommended Action: Screen monitoring well in the bedrock aquifer

Field Operations Leader (Signature): _____ Date: _____

Disposition/Action: MW-223 installed as a bedrock well.

Project Manager (Signature): _____ Date: _____

Distribution:	Program Manager:	_____	Others as Required:
	Project Manager:	_____	_____
	Quality Assurance Officer:	_____	_____
	Field Operations Leader:	_____	_____
	Project File:	_____	_____



TETRA TECH NUS, INC.

FIELD MODIFICATION RECORD

003

Site Name: _____ Location: _____

Project Number: _____ Task Assignment: _____

To: _____ Location: _____ Date: _____

Description: ^{Historic} Monitoring well MW-11 was reinstalled using DPT
in the original location.

Reason for Change: MW-11 could not be re-located. Presumed destroyed.
DPT was used because location is in active construction zone.

A temporary well point was advanced for collection of
overburden ground water and soil gas

Recommended Action: MW-11a installed on weekend for
collection of gw and sg. well renamed to
replace MW-11.

Field Operations Leader (Signature): _____ Date: _____

Disposition/Action: MW-11a approved for installation

Project Manager (Signature): _____ Date: _____

Distribution:	Program Manager:	_____	Others as Required:
	Project Manager:	_____	_____
	Quality Assurance Officer:	_____	_____
	Field Operations Leader:	_____	_____
	Project File:	_____	_____



TETRA TECH NUS, INC.

FIELD MODIFICATION RECORD

604

Site Name: _____ Location: _____

Project Number: _____ Task Assignment: _____

To: _____ Location: _____ Date: _____

Description: Historic MW-02 could not be located. Decision
made to re-install monitoring well in surveyed location

Reason for Change: MW-02 could not be re-located

Recommended Action: Reinstall MW-02 and re-name as
MW-02A. Well screened as original

Field Operations Leader (Signature): _____ Date: _____

Disposition/Action: MW-02A installed to replace MW-02

Project Manager (Signature): _____ Date: _____

Distribution:	Program Manager:	_____	Others as Required:
	Project Manager:	_____	_____
	Quality Assurance Officer:	_____	_____
	Field Operations Leader:	_____	_____
	Project File:	_____	_____



TETRA TECH NUS, INC.

FIELD MODIFICATION RECORD

005

Site Name: _____ Location: _____

Project Number: _____ Task Assignment: _____

To: _____ Location: _____ Date: _____

Description: Monitoring well MW-219 ^{location} was adjusted to the
South

Reason for Change: The original location was in a restricted
area (armory) and in close proximity to underground
utilities

Recommended Action: MW-219 re-located south of original
location

Field Operations Leader (Signature): _____ Date: _____

Disposition/Action: MW-219 installed in recommended area.

Project Manager (Signature): _____ Date: _____

Distribution:	Program Manager:	_____	Others as Required:
	Project Manager:	_____	_____
	Quality Assurance Officer:	_____	_____
	Field Operations Leader:	_____	_____
	Project File:	_____	_____



TETRA TECH NUS, INC.

FIELD MODIFICATION RECORD

006

Site Name: _____ Location: _____

Project Number: _____ Task Assignment: _____

To: _____ Location: _____ Date: _____

Description: Sample SB-218 proposed in transformer bank
Area was re-named SB-224

Reason for Change: Sample name duplication

Recommended Action: Name change SB-218 to SB-224

Field Operations Leader (Signature): _____ Date: _____

Disposition/Action: Sample name approved

Project Manager (Signature): _____ Date: _____

Distribution:	Program Manager:	_____	Others as Required:
	Project Manager:	_____	_____
	Quality Assurance Officer:	_____	_____
	Field Operations Leader:	_____	_____
	Project File:	_____	_____

APPENDIX D

GW-001 EPA REGION I LOW-FLOW SOP

U.S. ENVIRONMENTAL PROTECTION AGENCY REGION I

LOW STRESS (low flow) PURGING AND SAMPLING PROCEDURE FOR THE COLLECTION OF GROUNDWATER SAMPLES FROM MONITORING WELLS

Quality Assurance Unit
U.S. Environmental Protection Agency – Region 1
11 Technology Drive
North Chelmsford, MA 01863

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Prepared by: Charles Porfert
(Charles Porfert, Quality Assurance Unit)

1/19/10
Date

Approved by: Gerard Sotolongo
(Gerard Sotolongo, Quality Assurance Unit)

1-19-10
Date

Revision Page

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USE OF TERMS

Equipment blank: The equipment blank shall include the pump and the pump's tubing. If tubing is dedicated to the well, the equipment blank needs only to include the pump in subsequent sampling rounds. If the pump and tubing are dedicated to the well, the equipment blank is collected prior to its placement in the well. If the pump and tubing will be used to sample multiple wells, the equipment blank is normally collected after sampling from contaminated wells and not after background wells.

Field duplicates: Field duplicates are collected to determine precision of the sampling procedure. For this procedure, collect duplicate for each analyte group in consecutive order (VOC original, VOC duplicate, SVOC original, SVOC duplicate, etc.).

Indicator field parameters: This SOP uses field measurements of turbidity, dissolved oxygen, specific conductance, temperature, pH, and oxidation/reduction potential (ORP) as indicators of when purging operations are sufficient and sample collection may begin.

Matrix Spike/Matrix Spike Duplicates: Used by the laboratory in its quality assurance program. Consult the laboratory for the sample volume to be collected.

Potentiometric Surface: The level to which water rises in a tightly cased well constructed in a confined aquifer. In an unconfined aquifer, the potentiometric surface is the water table.

QAPP: Quality Assurance Project Plan

SAP: Sampling and Analysis Plan

SOP: Standard operating procedure

Stabilization: A condition that is achieved when all indicator field parameter measurements are sufficiently stable (as described in the "Monitoring Indicator Field Parameters" section) to allow sample collection to begin.

Temperature blank: A temperature blank is added to each sample cooler. The blank is measured upon receipt at the laboratory to assess whether the samples were properly cooled during transit.

Trip blank (VOCs): Trip blank is a sample of analyte-free water taken to the sampling site and returned to the laboratory. The trip blanks (one pair) are added to each sample cooler that contains VOC samples.

SCOPE & APPLICATION

The goal of this groundwater sampling procedure is to collect water samples that reflect the total mobile organic and inorganic loads (dissolved and colloidal sized fractions) transported through the subsurface under ambient flow conditions, with minimal physical and chemical alterations from sampling operations. This standard operating procedure (SOP) for collecting groundwater samples will help ensure that the project's data quality objectives (DQOs) are met under certain low-flow conditions.

The SOP emphasizes the need to minimize hydraulic stress at the well-aquifer interface by maintaining low water-level drawdowns, and by using low pumping rates during purging and sampling operations. Indicator field parameters (e.g., dissolved oxygen, pH, etc.) are monitored during purging in order to determine when sample collection may begin. Samples properly collected using this SOP are suitable for analysis of groundwater contaminants (volatile and semi-volatile organic analytes, dissolved gases, pesticides, PCBs, metals and other inorganics), or naturally occurring analytes. This SOP is based on Puls, and Barcelona (1996).

This procedure is designed for monitoring wells with an inside diameter (1.5-inches or greater) that can accommodate a positive lift pump with a screen length or open interval ten feet or less and with a water level above the top of the screen or open interval (Hereafter, the "screen or open interval" will be referred to only as "screen interval"). This SOP is not applicable to other well-sampling conditions.

While the use of dedicated sampling equipment is not mandatory, dedicated pumps and tubing can reduce sampling costs significantly by streamlining sampling activities and thereby reducing the overall field costs.

The goal of this procedure is to emphasize the need for consistency in deploying and operating equipment while purging and sampling monitoring wells during each sampling event. This will help to minimize sampling variability.

This procedure describes a general framework for groundwater sampling. Other site specific information (hydrogeological context, conceptual site model (CSM), DQOs, etc.) coupled with systematic planning must be added to the procedure in order to develop an appropriate site specific SAP/QAPP. In addition, the site specific SAP/QAPP must identify the specific equipment that will be used to collect the groundwater samples.

This procedure does not address the collection of water or free product samples from wells containing free phase LNAPLs and/or DNAPLs (light or dense non-aqueous phase

liquids). For this type of situation, the reader may wish to check: Cohen, and Mercer (1993) or other pertinent documents.

This SOP is to be used when collecting groundwater samples from monitoring wells at all Superfund, Federal Facility and RCRA sites in Region 1 under the conditions described herein. Request for modification of this SOP, in order to better address specific situations at individual wells, must include adequate technical justification for proposed changes. All changes and modifications must be approved and included in a revised SAP/QAPP before implementation in field.

BACKGROUND FOR IMPLEMENTATION

It is expected that the monitoring well screen has been properly located (both laterally and vertically) to intercept existing contaminant plume(s) or along flow paths of potential contaminant migration. Problems with inappropriate monitoring well placement or faulty/improper well installation cannot be overcome by even the best water sampling procedures. This SOP presumes that the analytes of interest are moving (or will potentially move) primarily through the more permeable zones intercepted by the screen interval.

Proper well construction, development, and operation and maintenance cannot be overemphasized. The use of installation techniques that are appropriate to the hydrogeologic setting of the site often prevent "problem well" situations from occurring. During well development, or redevelopment, tests should be conducted to determine the hydraulic characteristics of the monitoring well. The data can then be used to set the purging/sampling rate, and provide a baseline for evaluating changes in well performance and the potential need for well rehabilitation. Note: if this installation data or well history (construction and sampling) is not available or discoverable, for all wells to be sampled, efforts to build a sampling history should commence with the next sampling event.

The pump intake should be located within the screen interval and at a depth that will remain under water at all times. It is recommended that the intake depth and pumping rate remain the same for all sampling events. The mid-point or the lowest historical midpoint of the saturated screen length is often used as the location of the pump intake. For new wells, or for wells without pump intake depth information, the site's SAP/QAPP must provide clear reasons and instructions on how the pump intake depth(s) will be selected, and reason(s) for the depth(s) selected. If the depths to top and bottom of the well screen are not known, the SAP/QAPP will need to describe how the sampling depth will be determined and how the data can be used.

Stabilization of indicator field parameters is used to indicate that conditions are suitable for sampling to begin. Achievement of turbidity levels of less than 5 NTU, and stable drawdowns of less than 0.3 feet, while desirable, are not mandatory. Sample collection

may still take place provided the indicator field parameter criteria in this procedure are met. If after 2 hours of purging indicator field parameters have not stabilized, one of three optional courses of action may be taken: a) continue purging until stabilization is achieved, b) discontinue purging, do not collect any samples, and record in log book that stabilization could not be achieved (documentation must describe attempts to achieve stabilization), c) discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization (note: there is a risk that the analytical data obtained, especially metals and strongly hydrophobic organic analytes, may reflect a sampling bias and therefore, the data may not meet the data quality objectives of the sampling event).

It is recommended that low-flow sampling be conducted when the air temperature is above 32°F (0°C). If the procedure is used below 32°F, special precautions will need to be taken to prevent the groundwater from freezing in the equipment. Because sampling during freezing temperatures may adversely impact the data quality objectives, the need for water sample collection during months when these conditions are likely to occur should be evaluated during site planning and special sampling measures may need to be developed. Ice formation in the flow-through-cell will cause the monitoring probes to act erratically. A transparent flow-through-cell needs to be used to observe if ice is forming in the cell. If ice starts to form on the other pieces of the sampling equipment, additional problems may occur.

HEALTH & SAFETY

When working on-site, comply with all applicable OSHA requirements and the site's health/safety procedures. All proper personal protection clothing and equipment are to be worn. Some samples may contain biological and chemical hazards. These samples should be handled with suitable protection to skin, eyes, etc.

CAUTIONS

The following cautions need to be considered when planning to collect groundwater samples when the below conditions occur.

If the groundwater degasses during purging of the monitoring well, dissolved gases and VOCs will be lost. When this happens, the groundwater data for dissolved gases (e.g., methane, ethene, ethane, dissolved oxygen, etc.) and VOCs will need to be qualified. Some conditions that can promote degassing are the use of a vacuum pump (e.g., peristaltic pumps), changes in aperture along the sampling tubing, and squeezing/pinching the pump's tubing which results in a pressure change.

When collecting the samples for dissolved gases and VOCs analyses, avoid aerating the groundwater in the pump's tubing. This can cause loss of the dissolved gases and VOCs in

the groundwater. Having the pump's tubing completely filled prior to sampling will avoid this problem when using a centrifugal pump or peristaltic pump.

Direct sun light and hot ambient air temperatures may cause the groundwater in the tubing and flow-through-cell to heat up. This may cause the groundwater to degas which will result in loss of VOCs and dissolved gases. When sampling under these conditions, the sampler will need to shade the equipment from the sunlight (e.g., umbrella, tent, etc.). If possible, sampling on hot days, or during the hottest time of the day, should be avoided. The tubing exiting the monitoring well should be kept as short as possible to avoid the sun light or ambient air from heating up the groundwater.

Thermal currents in the monitoring well may cause vertical mixing of water in the well bore. When the air temperature is colder than the groundwater temperature, it can cool the top of the water column. Colder water which is denser than warm water sinks to the bottom of the well and the warmer water at the bottom of the well rises, setting up a convection cell. "During low-flow sampling, the pumped water may be a mixture of convecting water from within the well casing and aquifer water moving inward through the screen. This mixing of water during low-flow sampling can substantially increase equilibration times, can cause false stabilization of indicator parameters, can give false indication of redox state, and can provide biological data that are not representative of the aquifer conditions" (Vroblecky 2007).

Failure to calibrate or perform proper maintenance on the sampling equipment and measurement instruments (e.g., dissolved oxygen meter, etc.) can result in faulty data being collected.

Interferences may result from using contaminated equipment, cleaning materials, sample containers, or uncontrolled ambient/surrounding air conditions (e.g., truck/vehicle exhaust nearby).

Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment and/or proper planning to avoid ambient air interferences. Note that the use of dedicated sampling equipment can also significantly reduce the time needed to complete each sampling event, will promote consistency in the sampling, and may reduce sampling bias by having the pump's intake at a constant depth.

Clean and decontaminate all sampling equipment prior to use. All sampling equipment needs to be routinely checked to be free from contaminants and equipment blanks collected to ensure that the equipment is free of contaminants. Check the previous equipment blank data for the site (if they exist) to determine if the previous cleaning procedure removed the contaminants. If contaminants were detected and they are a concern, then a more vigorous cleaning procedure will be needed.

PERSONNEL QUALIFICATIONS

All field samplers working at sites containing hazardous waste must meet the requirements of the OSHA regulations. OSHA regulations may require the sampler to take the 40 hour OSHA health and safety training course and a refresher course prior to engaging in any field activities, depending upon the site and field conditions.

The field samplers must be trained prior to the use of the sampling equipment, field instruments, and procedures. Training is to be conducted by an experienced sampler before initiating any sampling procedure.

The entire sampling team needs to read, and be familiar with, the site Health and Safety Plan, all relevant SOPs, and SAP/QAPP (and the most recent amendments) before going onsite for the sampling event. It is recommended that the field sampling leader attest to the understanding of these site documents and that it is recorded.

EQUIPMENT AND SUPPLIES

A. Informational materials for sampling event

A copy of the current Health and Safety Plan, SAP/QAPP, monitoring well construction data, location map(s), field data from last sampling event, manuals for sampling, and the monitoring instruments' operation, maintenance, and calibration manuals should be brought to the site.

B. Well keys.

C. Extraction device

Adjustable rate, submersible pumps (e.g., centrifugal, bladder, etc.) which are constructed of stainless steel or Teflon are preferred. Note: if extraction devices constructed of other materials are to be used, adequate information must be provided to show that the substituted materials do not leach contaminants nor cause interferences to the analytical procedures to be used. Acceptance of these materials must be obtained before the sampling event.

If bladder pumps are selected for the collection of VOCs and dissolved gases, the pump setting should be set so that one pulse will deliver a water volume that is sufficient to fill a 40 mL VOC vial. This is not mandatory, but is considered a "best practice". For the proper operation, the bladder pump will need a minimum amount of water above the pump; consult the manufacturer for the recommended submergence. The pump's recommended submergence value should be determined during the planning stage, since it may influence well construction and placement of dedicated pumps where water-level fluctuations are significant.

Adjustable rate, peristaltic pumps (suction) are to be used with caution when collecting samples for VOCs and dissolved gases (e.g., methane, carbon dioxide, etc.) analyses. Additional information on the use of peristaltic pumps can be found in Appendix A. If peristaltic pumps are used, the inside diameter of the rotor head tubing needs to match the inside diameter of the tubing installed in the monitoring well.

Inertial pumping devices (motor driven or manual) are not recommended. These devices frequently cause greater disturbance during purging and sampling, and are less easily controlled than submersible pumps (potentially increasing turbidity and sampling variability, etc.). This can lead to sampling results that are adversely affected by purging and sampling operations, and a higher degree of data variability.

D. Tubing

Teflon or Teflon-lined polyethylene tubing are preferred when sampling is to include VOCs, SVOCs, pesticides, PCBs and inorganics. Note: if tubing constructed of other materials is to be used, adequate information must be provided to show that the substituted materials do not leach contaminants nor cause interferences to the analytical procedures to be used. Acceptance of these materials must be obtained before the sampling event.

PVC, polypropylene or polyethylene tubing may be used when collecting samples for metal and other inorganics analyses.

The use of 1/4 inch or 3/8 inch (inside diameter) tubing is recommended. This will help ensure that the tubing remains liquid filled when operating at very low pumping rates when using centrifugal and peristaltic pumps.

Silastic tubing should be used for the section around the rotor head of a peristaltic pump. It should be less than a foot in length. The inside diameter of the tubing used at the pump rotor head must be the same as the inside diameter of tubing placed in the well. A tubing connector is used to connect the pump rotor head tubing to the well tubing. Alternatively, the two pieces of tubing can be connected to each other by placing the one end of the tubing inside the end of the other tubing. The tubing must not be reused.

E. The water level measuring device

Electronic "tape", pressure transducer, water level sounder/level indicator, etc. should be capable of measuring to 0.01 foot accuracy. Recording pressure transducers, mounted above the pump, are especially helpful in tracking water levels during pumping operations, but their use must include check measurements with a water level "tape" at the start and end of each sampling event.

F. Flow measurement supplies

Graduated cylinder (size according to flow rate) and stopwatch usually will suffice.

Large graduated bucket used to record total water purged from the well.

G. Interface probe

To be used to check on the presence of free phase liquids (LNAPL, or DNAPL) before purging begins (as needed).

H. Power source (generator, nitrogen tank, battery, etc.)

When a gasoline generator is used, locate it downwind and at least 30 feet from the well so that the exhaust fumes do not contaminate samples.

I. Indicator field parameter monitoring instruments

Use of a multi-parameter instrument capable of measuring pH, oxidation/reduction potential (ORP), dissolved oxygen (DO), specific conductance, temperature, and coupled with a flow-through-cell is required when measuring all indicator field parameters, except turbidity. Turbidity is collected using a separate instrument. Record equipment/instrument identification (manufacturer, and model number).

Transparent, small volume flow-through-cells (e.g., 250 mLs or less) are preferred. This allows observation of air bubbles and sediment buildup in the cell, which can interfere with the operation of the monitoring instrument probes, to be easily detected. A small volume cell facilitates rapid turnover of water in the cell between measurements of the indicator field parameters.

It is recommended to use a flow-through-cell and monitoring probes from the same manufacturer and model to avoid incompatibility between the probes and flow-through-cell.

Turbidity samples are collected before the flow-through-cell. A "T" connector coupled with a valve is connected between the pump's tubing and flow-through-cell. When a turbidity measurement is required, the valve is opened to allow the groundwater to flow into a container. The valve is closed and the container sample is then placed in the turbidimeter.

Standards are necessary to perform field calibration of instruments. A minimum of two standards are needed to bracket the instrument measurement range for all parameters except ORP which use a Zobell solution as a standard. For dissolved oxygen, a wet sponge used for the 100% saturation and a zero dissolved oxygen solution are used for the calibration.

Barometer (used in the calibration of the Dissolved Oxygen probe) and the conversion formula to convert the barometric pressure into the units of measure used by the Dissolved Oxygen meter are needed.

J. Decontamination supplies

Includes (for example) non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.

K. Record keeping supplies

Logbook(s), well purging forms, chain-of-custody forms, field instrument calibration forms, etc.

L. Sample bottles

M. Sample preservation supplies (as required by the analytical methods)

N. Sample tags or labels

O. PID or FID instrument

If appropriate, to detect VOCs for health and safety purposes, and provide qualitative field evaluations.

P. Miscellaneous Equipment

Equipment to keep the sampling apparatus shaded in the summer (e.g., umbrella) and from freezing in the winter. If the pump's tubing is allowed to heat up in the warm weather, the cold groundwater may degas as it is warmed in the tubing.

EQUIPMENT/INSTRUMENT CALIBRATION

Prior to the sampling event, perform maintenance checks on the equipment and instruments according to the manufacturer's manual and/or applicable SOP. This will ensure that the equipment/instruments are working properly before they are used in the field.

Prior to sampling, the monitoring instruments must be calibrated and the calibration documented. The instruments are calibrated using U.S Environmental Protection Agency Region 1 *Calibration of Field Instruments (temperature, pH, dissolved oxygen, conductivity/specific conductance, oxidation/reduction [ORP], and turbidity)*, January 19, 2010, or latest version or from one of the methods listed in 40CFR136, 40CFR141 and SW-846.

The instruments shall be calibrated at the beginning of each day. If the field measurement falls outside the calibration range, the instrument must be re-calibrated so that all measurements fall within the calibration range. At the end of each day, a calibration check is performed to verify that instruments remained in calibration throughout the day. This check is performed while the instrument is in measurement mode, not calibration mode. If the field instruments are being used to monitor the natural attenuation parameters, then a calibration check at mid-day is highly recommended to ensure that the instruments did not drift out of calibration. Note: during the day if the instrument reads zero or a negative number for dissolved oxygen, pH, specific conductance, or turbidity (negative value only), this indicates that the instrument drifted out of calibration or the instrument is malfunctioning. If this situation occurs the data from this instrument will need to be qualified or rejected.

PRELIMINARY SITE ACTIVITIES (as applicable)

Check the well for security (damage, evidence of tampering, missing lock, etc.) and record pertinent observations (include photograph as warranted).

If needed lay out sheet of clean polyethylene for monitoring and sampling equipment, unless equipment is elevated above the ground (e.g., on a table, etc.).

Remove well cap and if appropriate measure VOCs at the rim of the well with a PID or FID instrument and record reading in field logbook or on the well purge form.

If the well casing does not have an established reference point (usually a V-cut or indelible mark in the well casing), make one. Describe its location and record the date of the mark in the logbook (consider a photographic record as well). All water level measurements must be recorded relative to this reference point (and the altitude of this point should be determined using techniques that are appropriate to site's DQOs).

If water-table or potentiometric surface map(s) are to be constructed for the sampling event, perform synoptic water level measurement round (in the shortest possible time) before any purging and sampling activities begin. If possible, measure water level depth (to 0.01 ft.) and total well depth (to 0.1 ft.) the day before sampling begins, in order to allow for re-settlement of any particulates in the water column. This is especially important for those wells that have not been recently sampled because sediment buildup in the well may require the well to be redeveloped. If measurement of total well depth is not made the day before, it should be measured after sampling of the well is complete. All measurements must be taken from the established referenced point. Care should be taken to minimize water column disturbance.

Check newly constructed wells for the presence of LNAPLs or DNAPLs before the initial sampling round. If none are encountered, subsequent check measurements with an interface probe may not be necessary unless analytical data or field analysis signal a worsening situation. This SOP cannot be used in the presence of LNAPLs or DNAPLs. If NAPLs are present, the project team must decide upon an alternate sampling method. All project modifications must be approved and documented prior to implementation.

If available check intake depth and drawdown information from previous sampling event(s) for each well. Duplicate, to the extent practicable, the intake depth and extraction rate (use final pump dial setting information) from previous event(s). If changes are made in the intake depth or extraction rate(s) used during previous sampling event(s), for either portable or dedicated extraction devices, record new values, and explain reasons for the changes in the field logbook.

PURGING AND SAMPLING PROCEDURE

Purging and sampling wells in order of increasing chemical concentrations (known or anticipated) are preferred.

The use of dedicated pumps is recommended to minimize artificial mobilization and entrainment of particulates each time the well is sampled. Note that the use of dedicated sampling equipment can also significantly reduce the time needed to complete each

sampling event, will promote consistency in the sampling, and may reduce sampling bias by having the pump's intake at a constant depth.

A. Initial Water Level

Measure the water level in the well before installing the pump if a non-dedicated pump is being used. The initial water level is recorded on the purge form or in the field logbook.

B. Install Pump

Lower pump, safety cable, tubing and electrical lines slowly (to minimize disturbance) into the well to the appropriate depth (may not be the mid-point of the screen/open interval). The Sampling and Analysis Plan/Quality Assurance Project Plan should specify the sampling depth (used previously), or provide criteria for selection of intake depth for each new well. If possible keep the pump intake at least two feet above the bottom of the well, to minimize mobilization of particulates present in the bottom of the well.

Pump tubing lengths, above the top of well casing should be kept as short as possible to minimize heating the groundwater in the tubing by exposure to sun light and ambient air temperatures. Heating may cause the groundwater to degas, which is unacceptable for the collection of samples for VOC and dissolved gases analyses.

C. Measure Water Level

Before starting pump, measure water level. Install recording pressure transducer, if used to track drawdowns, to initialize starting condition.

D. Purge Well

From the time the pump starts purging and until the time the samples are collected, the purged water is discharged into a graduated bucket to determine the total volume of groundwater purged. This information is recorded on the purge form or in the field logbook.

Start the pump at low speed and slowly increase the speed until discharge occurs. Check water level. Check equipment for water leaks and if present fix or replace the affected equipment. Try to match pumping rate used during previous sampling event(s). Otherwise, adjust pump speed until there is little or no water level drawdown. If the minimal drawdown that can be achieved exceeds 0.3 feet, but remains stable, continue purging.

Monitor and record the water level and pumping rate every five minutes (or as appropriate) during purging. Record any pumping rate adjustments (both time and flow rate). Pumping rates should, as needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. Adjustments are best made in the first fifteen minutes of pumping in order to help minimize purging time. During pump start-up, drawdown may exceed the 0.3 feet target and then "recover" somewhat as pump flow adjustments are made. Purge volume calculations should utilize stabilized drawdown value, not the initial drawdown. If the initial water level is above the top of the screen do not allow the water level to fall into the well screen. The final purge volume must be greater than the stabilized drawdown volume plus the pump's tubing volume. If the drawdown has exceeded 0.3 feet and stabilizes, calculate the volume of water between the initial water level and the stabilized water level. Add the volume of the water which occupies the pump's tubing to this calculation. This combined volume of water needs to be purged from the well after the water level has stabilized before samples are collected.

Avoid the use of constriction devices on the tubing to decrease the flow rate because the constrictor will cause a pressure difference in the water column. This will cause the groundwater to degas and result in a loss of VOCs and dissolved gasses in the groundwater samples.

Note: the flow rate used to achieve a stable pumping level should remain constant while monitoring the indicator parameters for stabilization and while collecting the samples.

Wells with low recharge rates may require the use of special pumps capable of attaining very low pumping rates (e.g., bladder, peristaltic), and/or the use of dedicated equipment. For new monitoring wells, or wells where the following situation has not occurred before, if the recovery rate to the well is less than 50 mL/min., or the well is being essentially dewatered during purging, the well should be sampled as soon as the water level has recovered sufficiently to collect the volume needed for all anticipated samples. The project manager or field team leader will need to make the decision when samples should be collected, how the sample is to be collected, and the reasons recorded on the purge form or in the field logbook. A water level measurement needs to be performed and recorded before samples are collected. If the project manager decides to collect the samples using the pump, it is best during this recovery period that the pump intake tubing not be removed, since this will aggravate any turbidity problems. Samples in this specific situation may be collected without stabilization of indicator field parameters. Note that field conditions and efforts to overcome problematic situations must be recorded in order to support field decisions to deviate from normal procedures described in this SOP. If this type of problematic situation persists in a well, then water sample collection should be changed to a passive or no-purge method, if consistent with the site's DQOs, or have a new well installed.

E. Monitor Indicator Field Parameters

After the water level has stabilized, connect the "T" connector with a valve and the flow-through-cell to monitor the indicator field parameters. If excessive turbidity is anticipated or encountered with the pump startup, the well may be purged for a while without connecting up the flow-through-cell, in order to minimize particulate buildup in the cell (This is a judgment call made by the sampler). Water level drawdown measurements should be made as usual. If possible, the pump may be installed the day before purging to allow particulates that were disturbed during pump insertion to settle.

During well purging, monitor indicator field parameters (turbidity, temperature, specific conductance, pH, ORP, DO) at a frequency of five minute intervals or greater. The pump's flow rate must be able to "turn over" at least one flow-through-cell volume between measurements (for a 250 mL flow-through-cell with a flow rate of 50 mLs/min., the monitoring frequency would be every five minutes; for a 500 mL flow-through-cell it would be every ten minutes). If the cell volume cannot be replaced in the five minute interval, then the time between measurements must be increased accordingly. Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments followed by stabilization of indicator parameters. Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings are within the following limits:

Turbidity (10% for values greater than 5 NTU; if three Turbidity values are less than 5 NTU, consider the values as stabilized),

Dissolved Oxygen (10% for values greater than 0.5 mg/L, if three Dissolved Oxygen values are less than 0.5 mg/L, consider the values as stabilized),

Specific Conductance (3%),

Temperature (3%),

pH (± 0.1 unit),

Oxidation/Reduction Potential (± 10 millivolts).

All measurements, except turbidity, must be obtained using a flow-through-cell. Samples for turbidity measurements are obtained before water enters the flow-through-cell. Transparent flow-through-cells are preferred, because they allow field personnel to watch for particulate build-up within the cell. This build-up may affect indicator field parameter values measured within the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities. Record start and stop times and give a brief description of cleaning activities.

The flow-through-cell must be designed in a way that prevents gas bubble entrapment in the cell. Placing the flow-through-cell at a 45 degree angle with the port facing upward can help remove bubbles from the flow-through-cell (see Appendix B Low-Flow Setup Diagram). All during the measurement process, the flow-through-cell must remain free of any gas bubbles. Otherwise, the monitoring probes may act erratically. When the pump is turned off or cycling on/off (when using a bladder pump), water in the cell must not drain out. Monitoring probes must remain submerged in water at all times.

F. Collect Water Samples

When samples are collected for laboratory analyses, the pump's tubing is disconnected from the "T" connector with a valve and the flow-through-cell. The samples are collected directly from the pump's tubing. Samples must not be collected from the flow-through-cell or from the "T" connector with a valve.

VOC samples are normally collected first and directly into pre-preserved sample containers. However, this may not be the case for all sampling locations; the SAP/QAPP should list the order in which the samples are to be collected based on the project's objective(s). Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

If the pump's flow rate is too high to collect the VOC/dissolved gases samples, collect the other samples first. Lower the pump's flow rate to a reasonable rate and collect the VOC/dissolved gases samples and record the new flow rate.

During purging and sampling, the centrifugal/peristaltic pump tubing must remain filled with water to avoid aeration of the groundwater. It is recommended that 1/4 inch or 3/8 inch (inside diameter) tubing be used to help insure that the sample tubing remains water filled. If the pump tubing is not completely filled to the sampling point, use the following procedure to collect samples: collect non-VOC/dissolved gases samples first, then increase flow rate slightly until the water completely fills the tubing, collect the VOC/dissolved gases samples, and record new drawdown depth and flow rate.

For bladder pumps that will be used to collect VOC or dissolved gas samples, it is recommended that the pump be set to deliver long pulses of water so that one pulse will fill a 40 mL VOC vial.

Use pre-preserved sample containers or add preservative, as required by analytical methods, to the samples immediately after they are collected. Check the analytical methods (e.g. EPA SW-846, 40 CFR 136, water supply, etc.) for additional information on preservation.

If determination of filtered metal concentrations is a sampling objective, collect filtered water samples using the same low flow procedures. The use of an in-line filter (transparent housing preferred) is required, and the filter size ($0.45\ \mu\text{m}$ is commonly used) should be based on the sampling objective. Pre-rinse the filter with groundwater prior to sample collection. Make sure the filter is free of air bubbles before samples are collected. Preserve the filtered water sample immediately. Note: filtered water samples are not an acceptable substitute for unfiltered samples when the monitoring objective is to obtain chemical concentrations of total mobile contaminants in groundwater for human health or ecological risk calculations.

Label each sample as collected. Samples requiring cooling will be placed into a cooler with ice or refrigerant for delivery to the laboratory. Metal samples after acidification to a pH less than 2 do not need to be cooled.

G. Post Sampling Activities

If a recording pressure transducer is used to track drawdown, re-measure water level with tape.

After collection of samples, the pump tubing may be dedicated to the well for re-sampling (by hanging the tubing inside the well), decontaminated, or properly discarded.

Before securing the well, measure and record the well depth (to 0.1 ft.), if not measured the day before purging began. Note: measurement of total well depth annually is usually sufficient after the initial low stress sampling event. However, a greater frequency may be needed if the well has a "silting" problem or if confirmation of well identity is needed.

Secure the well.

DECONTAMINATION

Decontaminate sampling equipment prior to use in the first well and then following sampling of each well. Pumps should not be removed between purging and sampling operations. The pump, tubing, support cable and electrical wires which were in contact with the well should be decontaminated by one of the procedures listed below.

The use of dedicated pumps and tubing will reduce the amount of time spent on decontamination of the equipment. If dedicated pumps and tubing are used, only the initial sampling event will require decontamination of the pump and tubing.

Note if the previous equipment blank data showed that contaminant(s) were present after using the below procedure or the one described in the SAP/QAPP, a more vigorous procedure may be needed.

Procedure 1

Decontaminating solutions can be pumped from either buckets or short PVC casing sections through the pump and tubing. The pump may be disassembled and flushed with the decontaminating solutions. It is recommended that detergent and alcohol be used sparingly in the decontamination process and water flushing steps be extended to ensure that any sediment trapped in the pump is removed. The pump exterior and electrical wires must be rinsed with the decontaminating solutions, as well. The procedure is as follows:

Flush the equipment/pump with potable water.

Flush with non-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.

Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.

Optional - flush with isopropyl alcohol (pesticide grade; must be free of ketones {e.g., acetone}) or with methanol. This step may be required if the well is highly contaminated or if the equipment blank data from the previous sampling event show that the level of contaminants is significant.

Flush with distilled/deionized water. This step must remove all traces of alcohol (if used) from the equipment. The final water rinse must not be recycled.

Procedure 2

Steam clean the outside of the submersible pump.

Pump hot potable water from the steam cleaner through the inside of the pump. This can be accomplished by placing the pump inside a three or four inch diameter PVC pipe with end cap. Hot water from the steam cleaner jet will be directed inside the PVC pipe and the pump exterior will be cleaned. The hot water from the steam cleaner will then be pumped from the PVC pipe through the pump and collected into another container. Note: additives or solutions should not be added to the steam cleaner.

Pump non-phosphate detergent solution through the inside of the pump. If the solution is recycled, the solution must be changed periodically.

Pump potable water through the inside of the pump to remove all of the detergent solution. If the solution is recycled, the solution must be changed periodically.

Pump distilled/deionized water through the pump. The final water rinse must not be recycled.

FIELD QUALITY CONTROL

Quality control samples are required to verify that the sample collection and handling process has not compromised the quality of the groundwater samples. All field quality control samples must be prepared the same as regular investigation samples with regard to sample volume, containers, and preservation. Quality control samples include field duplicates, equipment blanks, matrix spike/matrix spike duplicates, trip blanks (VOCs), and temperature blanks.

FIELD LOGBOOK

A field log shall be kept to document all groundwater field monitoring activities (see Appendix C, example table), and record the following for each well:

Site name, municipality, state.

Well identifier, latitude-longitude or state grid coordinates.

Measuring point description (e.g., north side of PVC pipe).

Well depth, and measurement technique.

Well screen length.

Pump depth.

Static water level depth, date, time and measurement technique.

Presence and thickness of immiscible liquid (NAPL) layers and detection method.

Pumping rate, drawdown, indicator parameters values, calculated or measured total volume pumped, and clock time of each set of measurements.

Type of tubing used and its length.

Type of pump used.

Clock time of start and end of purging and sampling activity.

Types of sample bottles used and sample identification numbers.

Preservatives used.

Parameters requested for analyses.

Field observations during sampling event.

Name of sample collector(s).

Weather conditions, including approximate ambient air temperature.

QA/QC data for field instruments.

Any problems encountered should be highlighted.

Description of all sampling/monitoring equipment used, including trade names, model number, instrument identification number, diameters, material composition, etc.

DATA REPORT

Data reports are to include laboratory analytical results, QA/QC information, field indicator parameters measured during purging, field instrument calibration information, and whatever other field logbook information is needed to allow for a full evaluation of data usability.

Note: the use of trade, product, or firm names in this sampling procedure is for descriptive purposes only and does not constitute endorsement by the U.S. EPA.

REFERENCES

Cohen, R.M. and J.W. Mercer, 1993, *DNAPL Site Evaluation*; C.K. Smoley (CRC Press), Boca Raton, Florida.

Robert W. Puls and Michael J. Barcelona, *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, April 1996 (EPA/540/S-95/504).

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U.S. Environmental Protection Agency, Region 1, *Calibration of Field Instruments (temperature, pH, dissolved oxygen, conductivity/specific conductance, oxidation/reduction [ORP], and turbidity)*, January 19, 2010 or latest version.

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U.S. Environmental Protection Agency, 40 CFR 136.

U.S. Environmental Protection Agency, 40 CFR 141.

Vroblesky, Don A., Clifton C. Casey, and Mark A. Lowery, Summer 2007, Influence of Dissolved Oxygen Convection on Well Sampling, *Ground Water Monitoring & Remediation* 27, no. 3: 49-58.

APPENDIX A PERISTALTIC PUMPS

Before selecting a peristaltic pump to collect groundwater samples for VOCs and/or dissolved gases (e.g., methane, carbon dioxide, etc.) consideration should be given to the following:

- The decision of whether or not to use a peristaltic pump is dependent on the intended use of the data.
- If the additional sampling error that may be introduced by this device is NOT of concern for the VOC/dissolved gases data's intended use, then this device may be acceptable.
- If minor differences in the groundwater concentrations could effect the decision, such as to continue or terminate groundwater cleanup or whether the cleanup goals have been reached, then this device should NOT be used for VOC/dissolved gases sampling. In these cases, centrifugal or bladder pumps are a better choice for more accurate results.

EPA and USGS have documented their concerns with the use of the peristaltic pumps to collect water sample in the below documents.

- "Suction Pumps are not recommended because they may cause degassing, pH modification, and loss of volatile compounds" *A Compendium of Superfund Field Operations Methods*, EPA/540/P-87/001, December 1987.
- "The agency does not recommend the use of peristaltic pumps to sample ground water particularly for volatile organic analytes" *RCRA Ground-Water Monitoring Draft Technical Guidance*, EPA Office of Solid Waste, November 1992.
- "The peristaltic pump is limited to shallow applications and can cause degassing resulting in alteration of pH, alkalinity, and volatiles loss", *Low-flow (Minimal drawdown) Ground-Water Sampling Procedures*, by Robert Puls & Michael Barcelona, April 1996, EPA/540/S-95/504.
- "Suction-lift pumps, such as peristaltic pumps, can operate at a very low pumping rate; however, using negative pressure to lift the sample can result in the loss of volatile analytes", USGS Book 9 Techniques of Water-Resources Investigation, Chapter A4. (Version 2.0, 9/2006).

APPENDIX B

SUMMARY OF SAMPLING INSTRUCTIONS

These instructions are for using an adjustable rate, submersible pump or a peristaltic pump with the pump's intake placed at the midpoint of a 10 foot or less well screen or an open interval. The water level in the monitoring well is above the top of the well screen or open interval, the ambient temperature is above 32°F, and the equipment is not dedicated. Field instruments are already calibrated. The equipment is setup according to the diagram at the end of these instructions.

1. Review well installation information. Record well depth, length of screen or open interval, and depth to top of the well screen. Determine the pump's intake depth (e.g., mid-point of screen/open interval).
2. On the day of sampling, check security of the well casing, perform any safety checks needed for the site, lay out a sheet of polyethylene around the well (if necessary), and setup the equipment. If necessary a canopy or an equivalent item can be setup to shade the pump's tubing and flow-through-cell from the sun light to prevent the sun light from heating the groundwater.
3. Check well casing for a reference mark. If missing, make a reference mark. Measure the water level (initial) to 0.01 ft. and record this information.
4. Install the pump's intake to the appropriate depth (e.g., midpoint) of the well screen or open interval. Do not turn-on the pump at this time.
5. Measure water level and record this information.
6. Turn-on the pump and discharge the groundwater into a graduated waste bucket. Slowly increase the flow rate until the water level starts to drop. Reduce the flow rate slightly so the water level stabilizes. Record the pump's settings. Calculate the flow rate using a graduated container and a stop watch. Record the flow rate. Do not let the water level drop below the top of the well screen.

If the groundwater is highly turbid or colored, continue to discharge the water into the bucket until the water clears (visual observation); this usually takes a few minutes. The turbid or colored water is usually from the well being disturbed during the pump installation. If the water does not clear, then you need to make a choice whether to continue purging the well (hoping that it will clear after a reasonable time) or continue to

the next step. Note, it is sometimes helpful to install the pump the day before the sampling event so that the disturbed materials in the well can settle out.

If the water level drops to the top of the well screen during the purging of the well, stop purging the well, and do the following:

Wait for the well to recharge to a sufficient volume so samples can be collected. This may take awhile (pump maybe removed from well, if turbidity is not a problem). The project manager will need to make the decision when samples should be collected and the reasons recorded in the site's log book. A water level measurement needs to be performed and recorded before samples are collected. When samples are being collected, the water level must not drop below the top of the screen or open interval. Collect the samples from the pump's tubing. Always collect the VOCs and dissolved gases samples first. Normally, the samples requiring a small volume are collected before the large volume samples are collected just in case there is not sufficient water in the well to fill all the sample containers. All samples must be collected, preserved, and stored according to the analytical method. Remove the pump from the well and decontaminate the sampling equipment.

If the water level has dropped 0.3 feet or less from the initial water level (water level measure before the pump was installed); proceed to Step 7. If the water level has dropped more than 0.3 feet, calculate the volume of water between the initial water level and the stabilized water level. Add the volume of the water which occupies the pump's tubing to this calculation. This combined volume of water needs to be purged from the well after the water level has stabilized before samples are collected.

7. Attach the pump's tubing to the "T" connector with a valve (or a three-way stop cock). The pump's tubing from the well casing to the "T" connector must be as short as possible to prevent the groundwater in the tubing from heating up from the sun light or from the ambient air. Attach a short piece of tubing to the other end of the "T" connector to serve as a sampling port for the turbidity samples. Attach the remaining end of the "T" connector to a short piece of tubing and connect the tubing to the flow-through-cell bottom port. To the top port, attach a small piece of tubing to direct the water into a calibrated waste bucket. Fill the cell with the groundwater and remove all gas bubbles from the cell. Position the flow-through-cell in such a way that if gas bubbles enter the cell they can easily exit the cell. If the ports are on the same side of the cell and the cell is cylindrical shape, the cell can be placed at a 45-degree angle with the ports facing upwards; this position should keep any gas bubbles entering the cell away from the monitoring probes and allow the gas bubbles to exit the cell easily (see Low-Flow Setup Diagram). Note,

make sure there are no gas bubbles caught in the probes' protective guard; you may need to shake the cell to remove these bubbles.

8. Turn-on the monitoring probes and turbidity meter.

9. Record the temperature, pH, dissolved oxygen, specific conductance, and oxidation/reduction potential measurements. Open the valve on the "T" connector to collect a sample for the turbidity measurement, close the valve, do the measurement, and record this measurement. Calculate the pump's flow rate from the water exiting the flow-through-cell using a graduated container and a stop watch, and record the measurement. Measure and record the water level. Check flow-through-cell for gas bubbles and sediment; if present, remove them.

10. Repeat Step 9 every 5 minutes or as appropriate until monitoring parameters stabilized. Note at least one flow-through-cell volume must be exchanged between readings. If not, the time interval between readings will need to be increased. Stabilization is achieved when three consecutive measurements are within the following limits:

Turbidity (10% for values greater than 5 NTUs; if three Turbidity values are less than 5 NTUs, consider the values as stabilized),

Dissolved Oxygen (10% for values greater than 0.5 mg/L, if three Dissolved Oxygen values are less than 0.5 mg/L, consider the values as stabilized),

Specific Conductance (3%),

Temperature (3%),

pH (± 0.1 unit),

Oxidation/Reduction Potential (± 10 millivolts).

If these stabilization requirements do not stabilize in a reasonable time, the probes may have been coated from the materials in the groundwater, from a buildup of sediment in the flow-through-cell, or a gas bubble is lodged in the probe. The cell and the probes will need to be cleaned. Turn-off the probes (not the pump), disconnect the cell from the "T" connector and continue to purge the well. Disassemble the cell, remove the sediment, and clean the probes according to the manufacturer's instructions. Reassemble the cell and connect the cell to the "T" connector. Remove all gas bubbles from the cell, turn-on the probes, and continue the measurements. Record that the time the cell was cleaned.

11. When it is time to collect the groundwater samples, turn-off the monitoring probes, and disconnect the pump's tubing from the "T" connector. If you are using a centrifugal or peristaltic pump check the pump's tubing to determine if the tubing is completely filled with water (no air space).

All samples must be collected and preserved according to the analytical method. VOCs and dissolved gases samples are normally collected first and directly into pre-preserved sample containers. However, this may not be the case for all sampling locations; the SAP/QAPP should list the order in which the samples are to be collected based on the project's objective(s). Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

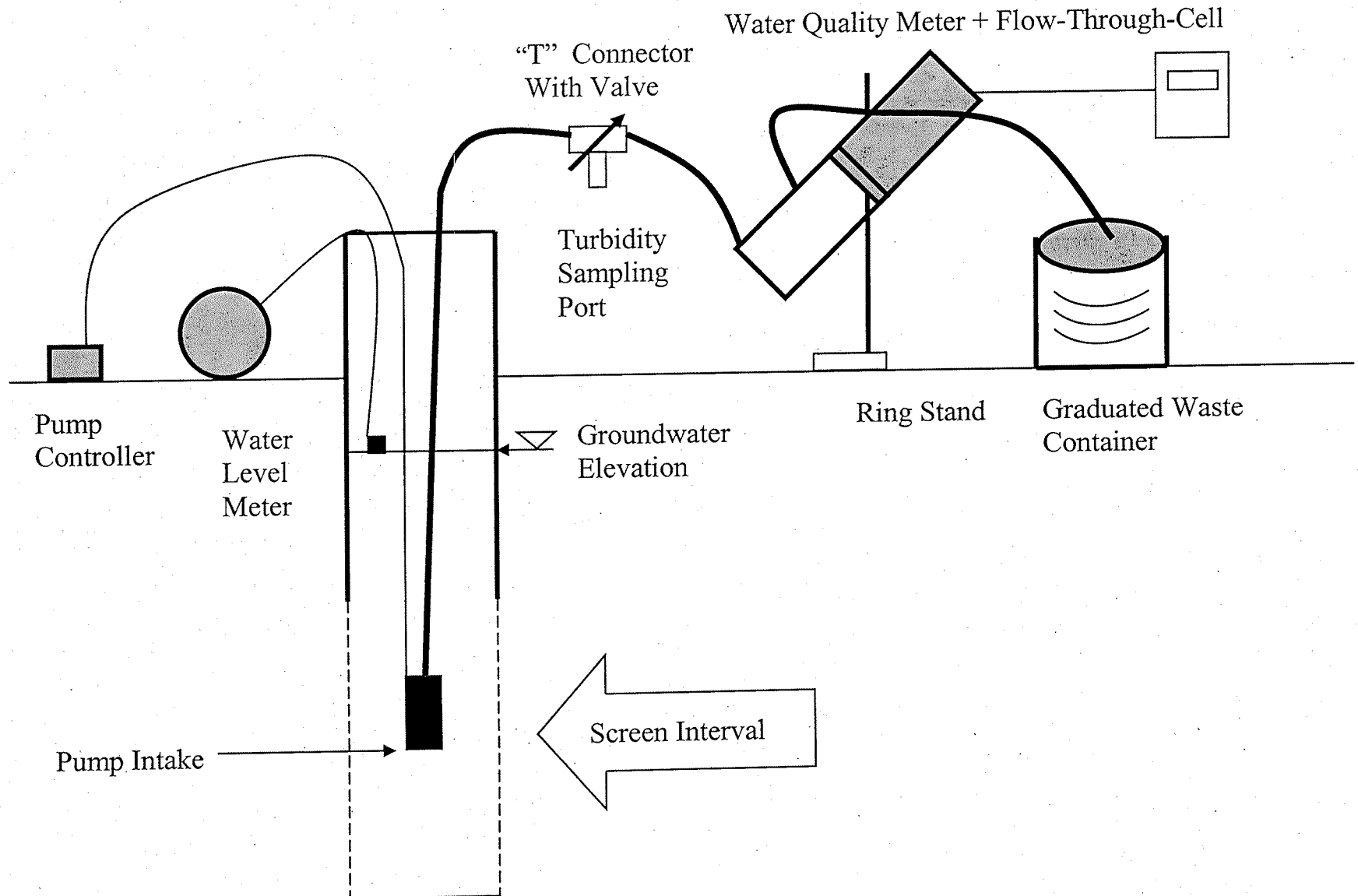
If the pump's tubing is not completely filled with water and the samples are being collected for VOCs and/or dissolved gases analyses using a centrifugal or peristaltic pump, do the following:

All samples must be collected and preserved according to the analytical method. The VOCs and the dissolved gases (e.g., methane, ethane, ethene, and carbon dioxide) samples are collected last. When it becomes time to collect these samples increase the pump's flow rate until the tubing is completely filled. Collect the samples and record the new flow rate.

12. Store the samples according to the analytical method.

13. Record the total purged volume (graduated waste bucket). Remove the pump from the well and decontaminate the sampling equipment.

Low-Flow Setup Diagram



APPENDIX C
EXAMPLE (Minimum Requirements)
WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

[illegible]

Stabilization Criteria

3%

3%

 $\pm 0.1 \pm 10 \text{ mV}$

10%

10%

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. μ Siemens per cm (same as μ mhos/cm) at 25°C.
3. Oxidation reduction potential (ORP)

APPENDIX E
2011 ANALYTICAL DATA RESULTS

E-1 SURFACE SOIL SAMPLE ANALYTICAL DATA

APPENDIX E-1
ANALYTICAL RESULTS - SURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID				DSY-SB204-SO-0002	DSY-SB204-SO-0002-D	DSY-SB204-SO-0002-AVG	DSY-SB205-SO-0002	DSY-SB206-SO-0002	DSY-SB207-SO-0002	DSY-SO-SB208-000.5	DSY-SO-SB208-000.5-D	DSY-SO-SB208-000.5-AVG	DSY-SO-SB209-0.30.7
TARGET AREA				HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.3 FT
BOTTOM DEPTH				2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL
SUBMATRIX				SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE_NCX0_1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	870000	540000	540000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	560	1300	560	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	1100	3600	1100	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
1,1-DICHLOROETHANE	3300	920000	3300	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
1,1-DICHLOROETHENE	24000	200	200	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
1,2,4-TRICHLOROBENZENE	22000	96000	22000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
1,2-DIBROMO-3-CHLOROPROPANE	5.4	500	5.4	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 UJ	NA	NA	NA	NA
1,2-DIBROMOETHANE	34	10	10	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
1,2-DICHLOROBENZENE	190000	510000	190000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
1,2-DICHLOROETHANE	430	900	430	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
1,2-DICHLOROPROPANE	890	1900	890	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
1,3-DICHLOROBENZENE		430000	430000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
1,4-DICHLOROBENZENE	2400	27000	2400	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
2-BUTANONE	2800000	10000000	2800000	5.52 U	3.26 J	3.01 J	5.43 U	3.92 U	4.17 U	NA	NA	NA	NA
2-HEXANONE	21000		21000	2.76 U	4.96 J	3.17 J	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
4-METHYL-2-PENTANONE	530000	1200000	530000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
ACETONE	6100000	7800000	6100000	11 UJ	31.4 J	18.4 J	27.3 J	9.96 J	16.5 J	NA	NA	NA	NA
BENZENE	1100	2500	1100	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
BROMODICHLOROMETHANE	270	10000	270	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
BROMOFORM	61000	81000	61000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
BROMOMETHANE	730	800	730	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	NA	NA	NA
CARBON DISULFIDE	82000		82000	2.76 U	2.5 U	2.63 U	3.28 J	1.96 U	2.09 U	NA	NA	NA	NA
CARBON TETRACHLORIDE	610	1500	610	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
CHLOROBENZENE	29000	210000	29000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
CHLORODIBROMOMETHANE	680	7600	680	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
CHLOROETHANE	1500000		1500000	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	NA	NA	NA
CHLOROFORM	290	1200	290	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
CHLOROMETHANE	12000		12000	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	16000	630000	16000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	1700		1700	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA

BLACK SHADING-EXCEEDS MINIMUM CRITERION; GRAY SHADING-DETECTED;U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

APPENDIX E-1
ANALYTICAL RESULTS - SURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID				DSY-SB204-SO-0002	DSY-SB204-SO-0002-D	DSY-SB204-SO-0002-AVG	DSY-SB205-SO-0002	DSY-SB206-SO-0002	DSY-SB207-SO-0002	DSY-SO-SB208-000.5	DSY-SO-SB208-000.5-D	DSY-SO-SB208-000.5-AVG	DSY-SO-SB209-0.30.7
TARGET AREA				HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.3 FT
BOTTOM DEPTH				2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL
SUBMATRIX				SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE_NCx0_1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM
VOLATILES (UG/KG) Cont.													
CYCLOHEXANE	700000		700000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
DICHLORODIFLUOROMETHANE	18000		18000	5.52 UJ	5 UJ	5.26 UJ	5.43 UJ	3.92 UJ	4.17 UJ	NA	NA	NA	NA
ETHYLBENZENE	5400	71000	5400	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
ISOPROPYLBENZENE	210000	27000	27000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
M+P-XYLENES				5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	NA	NA	NA
METHYL ACETATE	7800000		7800000	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	NA	NA	NA
METHYL CYCLOHEXANE				2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
METHYL TERT-BUTYL ETHER	43000	390000	43000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
METHYLENE CHLORIDE	11000	45000	11000	9.69 UJ	10.5 U	10.1 UJ	9.67 UJ	4.31 UJ	7.26 UJ	NA	NA	NA	NA
O-XYLENE	380000		380000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
STYRENE	630000	13000	13000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
TETRACHLOROETHENE	550	12000	550	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
TOLUENE	500000	190000	190000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
TOTAL 1,2-DICHLOROETHENE	70000	630000	70000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
TOTAL XYLENES	63000	110000	63000	8.28 U	7.5 U	7.89 U	8.15 U	5.88 U	6.26 U	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	15000		15000	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	1700		1700	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
TRICHLOROETHENE	2800	13000	2800	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
TRICHLOROFLUOROMETHANE	79000		79000	5.52 U	5 U	5.26 U	5.43 U	3.92 U	4.17 U	NA	NA	NA	NA
VINYL CHLORIDE	60	20	20	2.76 U	2.5 U	2.63 U	2.72 U	1.96 U	2.09 U	NA	NA	NA	NA
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG)													
2-METHYLNAPHTHALENE	31000	123000	31000	18 U	17.9 U	18 U	18.9 U	3.56 U	14.5 J	33.1 J	18.8 J	26 J	299
ACENAPHTHENE	340000	43000	43000	18 U	17.9 U	18 U	17.8 J	3.56 U	17.2 U	36.7 J	10 J	23.4 J	1000
ACENAPHTHYLENE	340000	23000	23000	18 U	17.9 U	18 U	19.9 J	3.56 U	17.2 U	3.97 U	3.94 U	3.96 U	695
ANTHRACENE	1700000	35000	35000	18 U	17.9 U	18 U	51.1	3.56 U	17.2 U	45.1 J	3.94 UJ	23.5 J	2290
BENZO(A)ANTHRACENE	150	900	150	22.5 J	17.9 UJ	15.7 J	232 J	3.56 UJ	31.8 J	149 J	51.5 J	100 J	5740
BENZO(A)PYRENE	15	400	15	14.5 J	17.9 U	11.7 J	165	3.56 U	29.6 J	129 J	46.3 J	87.6 J	4920
BENZO(B)FLUORANTHENE	150	900	150	22.1 J	17.9 U	15.5 J	263	3.56 U	54	194 J	67.4 J	131 J	7120
BENZO(G,H,I)PERYLENE	170000	800	800	18 U	17.9 U	18 U	119	1.92 J	25.8 J	59.5 J	28.4 J	44 J	2070
BENZO(K)FLUORANTHENE	1500	900	900	18 U	17.9 U	18 U	92.4	3.56 U	15.8 J	71.2 J	28.8 J	50 J	2480

BLACK SHADING-EXCEEDS MINIMUM CRITERION; GRAY SHADING-DETECTED;U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

APPENDIX E-1
ANALYTICAL RESULTS - SURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 3 of 8

SAMPLE ID				DSY-SB204-SO-0002	DSY-SB204-SO-0002-D	DSY-SB204-SO-0002-AVG	DSY-SB205-SO-0002	DSY-SB206-SO-0002	DSY-SB207-SO-0002	DSY-SO-SB208-000.5	DSY-SO-SB208-000.5-D	DSY-SO-SB208-000.5-AVG	DSY-SO-SB209-0.30.7
TARGET AREA				HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.3 FT
BOTTOM DEPTH				2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL
SUBMATRIX				SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE_NCx0_1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG) Cont.													
CHRYSENE	15000	400	400	24.1 J	17.9 U	16.5 J	238	3.56 U	39.8	161 J	48.1 J	105 J	5650
DIBENZO(A,H)ANTHRACENE	15	400	15	18 U	17.9 U	18 U	124	3.56 U	17.2 U	24.7	10.1 J	17.4 J	820
FLUORANTHENE	230000	20000	20000	31 J	17.9 U	20 J	424	3.56 U	50.6	350 J	103 J	226 J	13400
FLUORENE	230000	28000	28000	18 U	17.9 U	18 U	21.7 J	3.56 U	17.2 U	29.5	6.3 J	17.9 J	1220
INDENO(1,2,3-CD)PYRENE	150	900	150	15.1 J	17.9 U	12 J	99.1	3.56 U	24.6 J	55.1 J	23.5 J	39.3 J	2070
NAPHTHALENE	3600	54000	3600	18 U	17.9 U	18 U	18.9 U	3.56 U	18.4 J	24.5 J	14.7 J	19.6 J	751
PHENANTHRENE	170000	40000	40000	13.6 J	17.9 U	11.3 J	235	3.56 U	34.5	280 J	77.9 J	179 J	9530
PYRENE	170000	13000	13000	31.2 J	17.9 U	20.1 J	371	3.05 J	46.1	264 J	79.1 J	172 J	10100
PCBS (UG/KG)													
AROCLOR-1016	390		390	NA	NA	NA	NA	NA	NA	19.1 UJ	20 UJ	19.6 UJ	18.9 UJ
AROCLOR-1221	140		140	NA	NA	NA	NA	NA	NA	19.1 U	20 U	19.6 U	18.9 U
AROCLOR-1232	140		140	NA	NA	NA	NA	NA	NA	19.1 U	20 U	19.6 U	18.9 U
AROCLOR-1242	220		220	NA	NA	NA	NA	NA	NA	19.1 U	20 U	19.6 U	18.9 U
AROCLOR-1248	220		220	NA	NA	NA	NA	NA	NA	19.1 U	20 U	19.6 U	18.9 U
AROCLOR-1254	220		220	NA	NA	NA	NA	NA	NA	19.1 U	20 U	19.6 U	18.9 U
AROCLOR-1260	220		220	NA	NA	NA	NA	NA	NA	24.7 J	24.2 J	24.4 J	416 J
TOTAL AROCLOR	220	10000	220	NA	NA	NA	NA	NA	NA	24.7 J	24.2 J	24.4 J	416 J
METALS (MG/KG)													
ALUMINUM	7700		7700	5740	5380	5560	9650	5850	6720	10900	10900	10900	9120
ANTIMONY	3.1	10	3.1	0.441 UJ	0.444 UJ	0.442 UJ	0.915 UJ	0.437 UJ	0.833 UJ	2.41 UJ	0.486 UJ	1.45 UJ	0.467 UJ
ARSENIC	0.39	7	0.39	3.35	3.57	3.46	9.81	2.41	6.16	21.8 J	21.6 J	21.7 J	10.4 J
BARIUM	1500	5500	1500	6.46	6.2	6.33	33.2	11.6	18.2	26.1 J	35.4 J	30.8 J	22.6 J
BERYLLIUM	16	0.4	0.4	0.243 J	0.234 J	0.238 J	0.658	0.38	0.462 J	0.57 J	0.576	0.573 J	0.463
CADMIUM	7	39	7	0.11 U	0.111 U	0.11 U	0.229 UJ	0.109 U	0.208 U	0.603 U	0.122 U	0.362 U	0.232 J
CALCIUM				1710	650	1180	2290	695	715	416 J	611 J	514 J	1110 J
CHROMIUM	0.29	390	0.29	9.16	8.14	8.65	16.1	9.79	9.58	14.6	13.9	14.2	12.8
COBALT	2.3		2.3	4.55	4.05	4.3	9.56	3.94	6.42	14.6 J	13.9 J	14.2 J	8.62 J
COPPER	310	3100	310	8.07 J	7.7 J	7.88 J	39.1 J	6.65 J	21.6 J	23.4 J	24.8 J	24.1 J	33.5 J
IRON	5500		5500	16100	14700	15400	27100	13900	19600	32000	28800	30400	22500
LEAD	400	150	150	4.18 J	3.95 J	4.06 J	50.6 J	3.38 J	24.9 J	18.4 J	16.4 J	17.4 J	26.5 J

BLACK SHADING-EXCEEDS MINIMUM CRITERION; GRAY SHADING-DETECTED;U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

APPENDIX E-1
ANALYTICAL RESULTS - SURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID				DSY-SB204-SO-0002	DSY-SB204-SO-0002-D	DSY-SB204-SO-0002-AVG	DSY-SB205-SO-0002	DSY-SB206-SO-0002	DSY-SB207-SO-0002	DSY-SO-SB208-000.5	DSY-SO-SB208-000.5-D	DSY-SO-SB208-000.5-AVG	DSY-SO-SB209-0.30.7
TARGET AREA				HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB204	DSY-SB204	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB208	DSY-SB208	DSY-SB208	DSY-SB209
SAMPLE DATE				02/14/11	02/14/11	02/14/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.3 FT
BOTTOM DEPTH				2 FT	2 FT	2 FT	2 FT	2 FT	2 FT	0.5 FT	0.5 FT	0.5 FT	0.7 FT
SACODE				ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL
SUBMATRIX				SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE_NCx0_1	RISORES	MIN_SO	NM	FD	NM	NM	NM	NM	NM	FD	NM	NM
METALS (MG/KG) Cont.													
MAGNESIUM				2120	1940	2030	2680	2300	2100	2840	2910	2880	2910
MANGANESE	180	390	180	148 J	135 J	142 J	337 J	155 J	149 J	435	348	392	293
MERCURY	0.56	23	0.56	0.0292 U	0.0379 U	0.0336 U	0.037	0.038 U	0.0204 J	0.0247 J	0.0359 U	0.0213 J	0.0168 J
NICKEL	150	1000	150	12.2	11.5	11.8	21.4	12	15.8	25.5	26.3	25.9	21.1
POTASSIUM				271 J	287 J	279 J	614 J	639 J	318 J	904 U	304 J	378 J	394 J
SELENIUM	39	390	39	0.276 UJ	0.277 UJ	0.276 UJ	0.572 UJ	0.273 UJ	0.52 UJ	1.51 U	0.631	0.693	0.301 J
SILVER	39	200	39	0.11 U	0.111 U	0.11 U	0.229 U	0.109 U	0.208 U	0.603 U	0.122 U	0.362 U	0.583 U
SODIUM				166 U	166 U	166 U	343 U	164 U	312 U	904 U	182 U	543 U	71.4 J
THALLIUM		5.5	5.5	0.276 U	0.333 U	0.304 U	0.457 U	0.273 U	0.416 U	1.21 U	1.22 U	1.22 U	1.17 U
VANADIUM	39	550	39	10.3	8.84	9.57	21.1	9.48	12.3	25.1	18.6	21.8	14.2
ZINC	2300	6000	2300	28.1 J	25.3 J	26.7 J	77 J	26.2 J	51.5 J	75.5 J	86.4 J	81 J	137 J
PETROLEUM HYDROCARBONS (MG/KG)													
DIESEL RANGE ORGANICS		500	500	7.08 U	12.8	8.17	29.8	7.11 U	31.6	44.8	35.5	40.2	366
GASOLINE RANGE ORGANICS		500	500	5.87 U	4.28 U	5.08 U	4.48 U	5.52 U	4.06 U	2.83 J	4.82 J	3.82 J	3.74 U

APPENDIX E-1
ANALYTICAL RESULTS - SURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID				DSY-SO-SB215-000.5	DSY-SO-SB216-000.5	DSY-SO-SB217-000.5	DSY-SO-SB224-000.5	DSY-SO-SB224-000.5-D	DSY-SO-SB224-000.5-AVG
TARGET AREA				BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)
LOCATION ID				DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH				0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS
QC TYPE	EPARLSORE _NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	FD	NM
VOLATILES (UG/KG)									
1,1,1-TRICHLOROETHANE	870000	540000	540000	NA	NA	NA	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	560	1300	560	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	1100	3600	1100	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	3300	920000	3300	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	24000	200	200	NA	NA	NA	NA	NA	NA
1,2,4-TRICHLOROBENZENE	22000	96000	22000	NA	NA	NA	NA	NA	NA
1,2-DIBROMO-3-CHLOROPROPANE	5.4	500	5.4	NA	NA	NA	NA	NA	NA
1,2-DIBROMOETHANE	34	10	10	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	190000	510000	190000	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	430	900	430	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	890	1900	890	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE		430000	430000	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	2400	27000	2400	NA	NA	NA	NA	NA	NA
2-BUTANONE	2800000	10000000	2800000	NA	NA	NA	NA	NA	NA
2-HEXANONE	21000		21000	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	530000	1200000	530000	NA	NA	NA	NA	NA	NA
ACETONE	6100000	7800000	6100000	NA	NA	NA	NA	NA	NA
BENZENE	1100	2500	1100	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	270	10000	270	NA	NA	NA	NA	NA	NA
BROMOFORM	61000	81000	61000	NA	NA	NA	NA	NA	NA
BROMOMETHANE	730	800	730	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	82000		82000	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	610	1500	610	NA	NA	NA	NA	NA	NA
CHLOROBENZENE	29000	210000	29000	NA	NA	NA	NA	NA	NA
CHLORODIBROMOMETHANE	680	7600	680	NA	NA	NA	NA	NA	NA
CHLOROETHANE	1500000		1500000	NA	NA	NA	NA	NA	NA
CHLOROFORM	290	1200	290	NA	NA	NA	NA	NA	NA
CHLOROMETHANE	12000		12000	NA	NA	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	16000	630000	16000	NA	NA	NA	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	1700		1700	NA	NA	NA	NA	NA	NA

APPENDIX E-1
ANALYTICAL RESULTS - SURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 6 of 8

SAMPLE ID				DSY-SO-SB215-000.5	DSY-SO-SB216-000.5	DSY-SO-SB217-000.5	DSY-SO-SB224-000.5	DSY-SO-SB224-000.5-D	DSY-SO-SB224-000.5-AVG
TARGET AREA				BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)
LOCATION ID				DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH				0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS
QC TYPE	EPARLSORE _NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	FD	NM
VOLATILES (UG/KG) Cont.									
CYCLOHEXANE	700000		700000	NA	NA	NA	NA	NA	NA
DICHLORODIFLUOROMETHANE	18000		18000	NA	NA	NA	NA	NA	NA
ETHYLBENZENE	5400	71000	5400	NA	NA	NA	NA	NA	NA
ISOPROPYLBENZENE	210000	27000	27000	NA	NA	NA	NA	NA	NA
M+P-XYLENES				NA	NA	NA	NA	NA	NA
METHYL ACETATE	7800000		7800000	NA	NA	NA	NA	NA	NA
METHYL CYCLOHEXANE				NA	NA	NA	NA	NA	NA
METHYL TERT-BUTYL ETHER	43000	390000	43000	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	11000	45000	11000	NA	NA	NA	NA	NA	NA
O-XYLENE	380000		380000	NA	NA	NA	NA	NA	NA
STYRENE	630000	13000	13000	NA	NA	NA	NA	NA	NA
TETRACHLOROETHENE	550	12000	550	NA	NA	NA	NA	NA	NA
TOLUENE	500000	190000	190000	NA	NA	NA	NA	NA	NA
TOTAL 1,2-DICHLOROETHENE	70000	630000	70000	NA	NA	NA	NA	NA	NA
TOTAL XYLENES	63000	110000	63000	NA	NA	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	15000		15000	NA	NA	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	1700		1700	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE	2800	13000	2800	NA	NA	NA	NA	NA	NA
TRICHLOROFLUOROMETHANE	79000		79000	NA	NA	NA	NA	NA	NA
VINYL CHLORIDE	60	20	20	NA	NA	NA	NA	NA	NA
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG)									
2-METHYLNAPHTHALENE	31000	123000	31000	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	340000	43000	43000	NA	NA	NA	NA	NA	NA
ACENAPHTHYLENE	340000	23000	23000	NA	NA	NA	NA	NA	NA
ANTHRACENE	1700000	35000	35000	NA	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE	150	900	150	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	15	400	15	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	150	900	150	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	170000	800	800	NA	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	1500	900	900	NA	NA	NA	NA	NA	NA

BLACK SHADING-EXCEEDS MINIMUM CRITERION; GRAY SHADING-DETECTED;U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

APPENDIX E-1
ANALYTICAL RESULTS - SURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 7 of 8

SAMPLE ID				DSY-SO-SB215-000.5	DSY-SO-SB216-000.5	DSY-SO-SB217-000.5	DSY-SO-SB224-000.5	DSY-SO-SB224-000.5-D	DSY-SO-SB224-000.5-AVG
TARGET AREA				BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)
LOCATION ID				DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH				0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS
QC TYPE	EPARSLSORE _NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	FD	NM
POLYCYCLIC AROMATIC									
HYDROCARBONS (UG/KG) Cont.									
CHRYSENE	15000	400	400	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	15	400	15	NA	NA	NA	NA	NA	NA
FLUORANTHENE	230000	20000	20000	NA	NA	NA	NA	NA	NA
FLUORENE	230000	28000	28000	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	150	900	150	NA	NA	NA	NA	NA	NA
NAPHTHALENE	3600	54000	3600	NA	NA	NA	NA	NA	NA
PHENANTHRENE	170000	40000	40000	NA	NA	NA	NA	NA	NA
PYRENE	170000	13000	13000	NA	NA	NA	NA	NA	NA
PCBS (UG/KG)									
AROCLOR-1016	390		390	18.1 UJ	17.7 UJ	17.8 UJ	17.8 UJ	17.2 UJ	17.5 UJ
AROCLOR-1221	140		140	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
AROCLOR-1232	140		140	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
AROCLOR-1242	220		220	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
AROCLOR-1248	220		220	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
AROCLOR-1254	220		220	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
AROCLOR-1260	220		220	18.1 U	17.7 U	17.8 U	17.8 U	17.2 U	17.5 U
TOTAL AROCLOR	220	10000	220	18.1 UJ	17.7 UJ	17.8 UJ	17.8 UJ	17.2 UJ	17.5 UJ
METALS (MG/KG)									
ALUMINUM	7700		7700	NA	NA	NA	NA	NA	NA
ANTIMONY	3.1	10	3.1	NA	NA	NA	NA	NA	NA
ARSENIC	0.39	7	0.39	NA	NA	NA	NA	NA	NA
BARIUM	1500	5500	1500	NA	NA	NA	NA	NA	NA
BERYLLIUM	16	0.4	0.4	NA	NA	NA	NA	NA	NA
CADMIUM	7	39	7	NA	NA	NA	NA	NA	NA
CALCIUM				NA	NA	NA	NA	NA	NA
CHROMIUM	0.29	390	0.29	NA	NA	NA	NA	NA	NA
COBALT	2.3		2.3	NA	NA	NA	NA	NA	NA
COPPER	310	3100	310	NA	NA	NA	NA	NA	NA
IRON	5500		5500	NA	NA	NA	NA	NA	NA
LEAD	400	150	150	NA	NA	NA	NA	NA	NA

APPENDIX E-1
ANALYTICAL RESULTS - SURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 8 of 8

SAMPLE ID				DSY-SO-SB215-000.5	DSY-SO-SB216-000.5	DSY-SO-SB217-000.5	DSY-SO-SB224-000.5	DSY-SO-SB224-000.5-D	DSY-SO-SB224-000.5-AVG
TARGET AREA				BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)	BLDG. 6 - TP-14 AREA (TRANSFORMER BANK)
LOCATION ID				DSY-SB215	DSY-SB216	DSY-SB217	DSY-SB224	DSY-SB224	DSY-SB224
SAMPLE DATE				02/22/11	02/22/11	02/22/11	02/22/11	02/22/11	02/22/11
TOP DEPTH				0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH				0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG
SUBMATRIX				SS	SS	SS	SS	SS	SS
QC TYPE	EPARLSORE _NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	FD	NM
METALS (MG/KG) Cont.									
MAGNESIUM				NA	NA	NA	NA	NA	NA
MANGANESE	180	390	180	NA	NA	NA	NA	NA	NA
MERCURY	0.56	23	0.56	NA	NA	NA	NA	NA	NA
NICKEL	150	1000	150	NA	NA	NA	NA	NA	NA
POTASSIUM				NA	NA	NA	NA	NA	NA
SELENIUM	39	390	39	NA	NA	NA	NA	NA	NA
SILVER	39	200	39	NA	NA	NA	NA	NA	NA
SODIUM				NA	NA	NA	NA	NA	NA
THALLIUM		5.5	5.5	NA	NA	NA	NA	NA	NA
VANADIUM	39	550	39	NA	NA	NA	NA	NA	NA
ZINC	2300	6000	2300	NA	NA	NA	NA	NA	NA
PETROLEUM HYDROCARBONS (MG/KG)									
DIESEL RANGE ORGANICS		500	500	NA	NA	NA	NA	NA	NA
GASOLINE RANGE ORGANICS		500	500	NA	NA	NA	NA	NA	NA

E-2 SUBSURFACE SOIL SAMPLE ANALYTICAL DATA

APPENDIX E - 2

ANALYTICAL RESULTS - SUBSURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 of 4

SAMPLE ID				DSY-SB201-SO-0204	DSY-SB202-SO-0204	DSY-SB204-SO-0810	DSY-SB205-SO-088.5	DSY-SB206-SO-0810	DSY-SB207-SO-1012	DSY-SO-SB210-0102	DSY-SO-SB211-0102	DSY-SO-SB212-0204	DSY-SO-SB213-0203	DSY-SO-SB214-0203
TARGET AREA				SOUTHERN WATERFRONT	SOUTHERN WATERFRONT	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
SACODE				NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX				SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
QC TYPE	EPARLSORE_NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)														
1,1,1-TRICHLOROETHANE	870000	540000	540000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	560	1300	560	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	1100	3600	1100	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	3300	920000	3300	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	24000	200	200	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
1,2,4-TRICHLOROBENZENE	22000	96000	22000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
1,2-DIBROMO-3-CHLOROPROPANE	5.4	500	5.4	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	NA	NA	NA	NA
1,2-DIBROMOETHANE	34	10	10	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	190000	510000	190000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	430	900	430	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	890	1900	890	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE		430000	430000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	2400	27000	2400	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
2-BUTANONE	2800000	10000000	2800000	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	NA	NA	NA	NA
2-HEXANONE	21000		21000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	530000	1200000	530000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
ACETONE	6100000	7800000	6100000	NA	NA	10.6 UJ	8.73 UJ	10.1 UJ	8.63 UJ	NA	NA	NA	NA	NA
BENZENE	1100	2500	1100	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	270	10000	270	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
BROMOFORM	61000	81000	61000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
BROMOMETHANE	730	800	730	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	NA	NA	NA	NA
CARBON DISULFIDE	82000		82000	NA	NA	2.65 U	2.6 J	2.51 U	2.16 U	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	610	1500	610	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
CHLOROBENZENE	29000	210000	29000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
CHLORODIBROMOMETHANE	680	7600	680	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
CHLOROETHANE	1500000		1500000	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	NA	NA	NA	NA
CHLOROFORM	290	1200	290	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
CHLOROMETHANE	12000		12000	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	16000	630000	16000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA

APPENDIX E - 2

ANALYTICAL RESULTS - SUBSURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 of 4

SAMPLE ID				DSY-SB201-SO-0204	DSY-SB202-SO-0204	DSY-SB204-SO-0810	DSY-SB205-SO-088.5	DSY-SB206-SO-0810	DSY-SB207-SO-1012	DSY-SO-SB210-0102	DSY-SO-SB211-0102	DSY-SO-SB212-0204	DSY-SO-SB213-0203	DSY-SO-SB214-0203
TARGET AREA				SOUTHERN WATERFRONT	SOUTHERN WATERFRONT	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
SACODE				NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX				SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
QC TYPE	EPARLSORE_NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG) Cont.														
CIS-1,3-DICHLOROPROPENE	1700		1700	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
CYCLOHEXANE	700000		700000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
DICHLORODIFLUOROMETHANE	18000		18000	NA	NA	5.3 UJ	4.36 UJ	5.03 UJ	4.32 UJ	NA	NA	NA	NA	NA
ETHYLBENZENE	5400	71000	5400	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
ISOPROPYLBENZENE	210000	27000	27000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
M+P-XYLENES				NA	NA	2.8 J	4.36 U	5.03 U	4.32 U	NA	NA	NA	NA	NA
METHYL ACETATE	7800000		7800000	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	NA	NA	NA	NA
METHYL CYCLOHEXANE				NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
METHYL TERT-BUTYL ETHER	43000	390000	43000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	11000	45000	11000	NA	NA	21 U	5.23 UJ	7.87 UJ	6.67 UJ	NA	NA	NA	NA	NA
O-XYLENE	380000		380000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
STYRENE	630000	13000	13000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
TETRACHLOROETHENE	550	12000	550	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
TOLUENE	500000	190000	190000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
TOTAL 1,2-DICHLOROETHENE	70000	630000	70000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
TOTAL XYLENES	63000	110000	63000	NA	NA	7.95 U	6.54 U	7.54 U	6.47 U	NA	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	15000		15000	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	1700		1700	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
TRICHLOROETHENE	2800	13000	2800	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
TRICHLOROFLUOROMETHANE	79000		79000	NA	NA	5.3 U	4.36 U	5.03 U	4.32 U	NA	NA	NA	NA	NA
VINYL CHLORIDE	60	20	20	NA	NA	2.65 U	2.18 U	2.51 U	2.16 U	NA	NA	NA	NA	NA
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG)														
2-METHYLNAPHTHALENE	31000	123000	31000	3.66 U	3.61 U	3.42 U	3.48 U	3.53 U	3.63 U	3.83 U	8.89 J	3.38 J	3.9 U	281
ACENAPHTHENE	340000	43000	43000	3.66 U	3.61 U	3.42 U	3.62 J	3.53 U	3.63 U	3.83 U	4.11 U	3.53 U	2.87 J	5.63 U
ACENAPHTHYLENE	340000	23000	23000	3.66 U	3.61 U	3.42 U	3.53 J	3.53 U	3.63 U	5.21 J	3.5 J	14.2	3.9 U	47.2
ANTHRACENE	1700000	35000	35000	3.66 U	3.61 U	3.42 U	8	3.53 U	3.63 U	5.83 J	4.11 U	17.2	4.71 J	5.63 U
BENZO(A)ANTHRACENE	150	900	150	3.66 UJ	3.61 UJ	3.42 UJ	27 J	3.53 UJ	3.63 UJ	41.3	38.1	60.5	32.5	252
BENZO(A)PYRENE	15	400	15	3.66 U	3.61 U	3.42 U	23.3	3.53 U	3.63 U	26.3	29.9	38.3	18.9	172
BENZO(B)FLUORANTHENE	150	900	150	3.66 U	3.61 U	3.42 U	41.1	3.53 U	2.65 J	38.8	44.4	57.9	26.6	336

BLACK SHADING-EXCEEDS MINIMUM CRITERION; GRAY SHADING-DETECTED;U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

APPENDIX E - 2

**ANALYTICAL RESULTS - SUBSURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 3 of 4**

SAMPLE ID				DSY-SB201-SO-0204	DSY-SB202-SO-0204	DSY-SB204-SO-0810	DSY-SB205-SO-088.5	DSY-SB206-SO-0810	DSY-SB207-SO-1012	DSY-SO-SB210-0102	DSY-SO-SB211-0102	DSY-SO-SB212-0204	DSY-SO-SB213-0203	DSY-SO-SB214-0203
TARGET AREA				SOUTHERN WATERFRONT	SOUTHERN WATERFRONT	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
SACODE				NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX				SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
QC TYPE	EPARLSORE_NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG) Cont.														
BENZO(G,H,I)PERYLENE	170000	800	800	3.66 U	3.61 U	3.42 U	21.6	3.53 U	2.51 J	15.7	21	20	10.7 J	91.1
BENZO(K)FLUORANTHENE	1500	900	900	3.66 U	3.61 U	3.42 U	11.2	3.53 U	3.63 U	16.1	17.5	25.6	11.3 J	124
CHRYSENE	15000	400	400	3.66 U	3.61 U	3.42 U	32.1	3.53 U	3.63 U	28.6	30.4	44.7	20.5	356
DIBENZO(A,H)ANTHRACENE	15	400	15	3.66 U	3.61 U	3.42 U	23.3	3.53 U	3.63 U	3.83 U	7.48 J	7.89 J	3.9 U	43.7
FLUORANTHENE	230000	20000	20000	3.66 U	3.61 U	3.42 U	55.3	3.53 U	2.19 J	61.2	39.6	128	43.2	451
FLUORENE	230000	28000	28000	3.66 U	3.61 U	3.42 U	2.93 J	3.53 U	3.63 U	2.22 J	4.11 U	8.85 J	2.67 J	5.63 U
INDENO(1,2,3-CD)PYRENE	150	900	150	3.66 U	3.61 U	3.42 U	18	3.53 U	3.63 U	12.3 J	18.5	17.4	10.2 J	82.7
NAPHTHALENE	3600	54000	3600	3.66 U	3.61 U	3.42 U	3.54 J	3.53 U	3.63 U	2.5 J	9.04 J	5.06 J	3.9 U	175
PHENANTHRENE	170000	40000	40000	3.66 U	3.61 U	3.42 U	30.8	3.53 U	2.1 J	24.8	25.2	91.3	25.8	400
PYRENE	170000	13000	13000	3.66 U	3.61 U	3.42 U	47.4	3.53 U	2.05 J	50.1	35.8	94.2	33.9	375
PCBS (UG/KG)														
AROCLOR-1016	390		390	NA	NA	NA	NA	NA	NA	18.6 UJ	20.7 UJ	17.2 UJ	18.9 U	26.9 UJ
AROCLOR-1221	140		140	NA	NA	NA	NA	NA	NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
AROCLOR-1232	140		140	NA	NA	NA	NA	NA	NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
AROCLOR-1242	220		220	NA	NA	NA	NA	NA	NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
AROCLOR-1248	220		220	NA	NA	NA	NA	NA	NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
AROCLOR-1254	220		220	NA	NA	NA	NA	NA	NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
AROCLOR-1260	220		220	NA	NA	NA	NA	NA	NA	18.6 U	20.7 U	17.2 U	18.9 U	26.9 UJ
TOTAL AROCLOR	220	10000	220	NA	NA	NA	NA	NA	NA	18.6 UJ	20.7 UJ	17.2 UJ	18.9 U	26.9 UJ
METALS (MG/KG)														
ALUMINUM	7700		7700	17400	15900	3290	5790	3190	6100	12600	11700	2180	12500	9150
ANTIMONY	3.1	10	3.1	0.912 UJ	0.858 UJ	0.425 UJ	0.84 UJ	0.43 UJ	0.88 UJ	2.38 UJ	0.476 UJ	0.428 UJ	2.27 UJ	1.15 J
ARSENIC	0.39	7	0.39	15.9	26.3	3.62	7.42	4.44	9.79	13 J	13.5 J	1.47 J	11.8 J	47.2 J
BARIUM	1500	5500	1500	14.6	14.8	4.5	8.85	4.43	5.11	24.2 J	31 J	20.4 J	16.4 J	57.7 J
BERYLLIUM	16	0.4	0.4	0.418 J	0.392 J	0.176 J	0.314 J	0.204 J	0.34 J	0.511 J	0.607	0.697	0.507 J	0.759
CADMIUM	7	39	7	0.228 U	0.214 U	0.106 U	0.21 U	0.108 U	0.22 U	0.595 U	0.119 U	0.107 U	0.567 U	0.0903 J
CALCIUM				1770	1000	443	1020	429	496 J	620 J	279 J	501 J	631 J	2040 J
CHROMIUM	0.29	390	0.29	21.2	18.2	4.98	9.49	5.27	8.77	15.4	12	0.788	18.5	11.6
COBALT	2.3		2.3	17.9	21.1	5.15	4.54	3.68	5.85	11.1 J	8.75 J	1.29 J	12.4 J	17 J

BLACK SHADING-EXCEEDS MINIMUM CRITERION; GRAY SHADING-DETECTED;U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

APPENDIX E - 2

**ANALYTICAL RESULTS - SUBSURFACE SOIL
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 4 of 4**

SAMPLE ID				DSY-SB201-SO-0204	DSY-SB202-SO-0204	DSY-SB204-SO-0810	DSY-SB205-SO-088.5	DSY-SB206-SO-0810	DSY-SB207-SO-1012	DSY-SO-SB210-0102	DSY-SO-SB211-0102	DSY-SO-SB212-0204	DSY-SO-SB213-0203	DSY-SO-SB214-0203
TARGET AREA				SOUTHERN WATERFRONT	SOUTHERN WATERFRONT	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	HUTS 1 AND 2	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA	BLDG. 6 - TP-14 AREA
LOCATION ID				DSY-SB201	DSY-SB202	DSY-SB204	DSY-SB205	DSY-SB206	DSY-SB207	DSY-SB210	DSY-SB211	DSY-SB212	DSY-SB213	DSY-SB214
SAMPLE DATE				02/11/11	02/09/11	02/11/11	02/15/11	02/14/11	02/15/11	02/25/11	02/25/11	02/25/11	02/25/11	02/25/11
TOP DEPTH				2 FT	2 FT	8 FT	8 FT	8 FT	10 FT	1 FT	1 FT	2 FT	2 FT	2 FT
BOTTOM DEPTH				4 FT	4 FT	10 FT	8.5 FT	10 FT	12 FT	2 FT	2 FT	4 FT	3 FT	3 FT
SACODE				NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX				SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
QC TYPE	EPARSLSORE_NCx0_1	RISORES	MIN_SO	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
METALS (MG/KG) Cont.														
COPPER	310	3100	310	29.9 J	28.2 J	4.42 J	12.5 J	5.25 J	11.7 J	20 J	13.7 J	1.67 J	19.1 J	39.5 J
IRON	5500		5500	44400	45500	9830	18300	12200	20900	35900	23600	6800	30900	22100
LEAD	400	150	150	9.49 J	13.6 J	1.96 J	13.8 J	2.81 J	8.23 J	12 J	16.1 J	2.49 J	17 J	81.4 J
MAGNESIUM				5220	4850	1110	1830	1110	1850	3610	2280	646	4010	2030
MANGANESE	180	390	180	488 J	681 J	169 J	145 J	95.7 J	171 J	428	358	305	346	1190
MERCURY	0.56	23	0.56	0.0351 U	0.0312 U	0.0331 U	0.0125 J	0.03 U	0.031 U	0.0138 J	0.0323 J	0.0276 U	0.0343 U	0.0603
NICKEL	150	1000	150	38.6	37.9	9.68	12.5	8.8	15	22.7	17	0.596	25.9	22
POTASSIUM				243 J	257 J	219 J	248 J	188 J	161 J	242 J	226 J	681 J	346 J	264 J
SELENIUM	39	390	39	0.57 UJ	0.536 U	0.16 J	0.525 UJ	0.269 UJ	0.55 UJ	1.49 U	0.67	0.268 U	1.42 U	1.31
SILVER	39	200	39	0.228 U	0.214 U	0.106 U	0.21 U	0.108 U	0.22 U	0.595 U	0.119 U	0.535 U	0.567 U	0.859 U
SODIUM				342 U	322 U	160 U	315 U	161 U	330 U	179 U	178 U	161 U	170 U	90.6 J
THALLIUM		5.5	5.5	0.57 U	0.536 U	0.213 U	0.42 U	0.215 U	0.44 U	1.19 U	1.19 U	1.07 U	1.13 U	1.72 U
VANADIUM	39	550	39	18.6	17.7	5.82	11	6.12	12.4	19.8	17.7	3.97	20.6	19.3
ZINC	2300	6000	2300	72.8 J	75.7 J	17.9 J	36 J	21.9 J	41.1 J	65.9 J	53.6 J	27.1 J	64.7 J	335 J
PETROLEUM HYDROCARBONS (MG/KG)														
DIESEL RANGE ORGANICS		500	500	NA	NA	7.49	6.99 U	6.83 U	7.31 U	37.6	48.2	17.8	25	NA
GASOLINE RANGE ORGANICS		500	500	NA	NA	5.09 U	4.22 U	5.04 U	4.9 U	4.37 U	4.66 U	4.39 U	3.43 U	6.9 UJ

E-3 GROUNDWATER SAMPLE ANALYTICAL DATA

APPENDIX E - 3

ANALYTICAL RESULTS - GROUNDWATER
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 of 8

SAMPLE ID				DSY-GW-MW02A-022411	DSY-GW-MW03-022411	DSY-GW-MW08-030111	DSY-GW-MW11A-022611	DSY-GW-MW11A-022611-D	DSY-GW-MW11A-022611-AVG	DSY-GW-MW12-030311	DSY-GW-MW204-031711
TARGET AREA				NORTHERN WATERFRONT	NORTHERN WATERFRONT	BLDG. 234 AREA	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	HUTS 1 AND 2
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM
VOLATILES (UG/L)											
1,1,1-TRICHLOROETHANE	200	200	200	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	7	7	7	0.5 U	0.5 U	0.25 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	70	70	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	0.2	0.2	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMOETHANE	0.05	0.05	0.05	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROBENZENE	600	600	600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	5	5	5	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-DICHLOROBENZENE		600	600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-DICHLOROBENZENE	75	75	75	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-BUTANONE				5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-HEXANONE				2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
4-METHYL-2-PENTANONE				2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
ACETONE				5 UJ	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U
BENZENE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMODICHLOROMETHANE	80		80	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOFORM	80		80	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOMETHANE				1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CARBON TETRACHLORIDE	5	5	5	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
CHLOROBENZENE	100	100	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLORODIBROMOMETHANE	80		80	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROETHANE				1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 UJ
CHLOROFORM	80		80	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROMETHANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	70	70	70	0.291 J	0.5 U	12.7	0.284 J	0.361 J	0.322 J	3.73	0.5 U
CIS-1,3-DICHLOROPROPENE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
CYCLOHEXANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U

BLACK SHADING-EXCEEDS MINIMUM CRITERION; GRAY SHADING-DETECTED;U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

APPENDIX E - 3

ANALYTICAL RESULTS - GROUNDWATER
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 of 8

SAMPLE ID				DSY-GW-MW02A-022411	DSY-GW-MW03-022411	DSY-GW-MW08-030111	DSY-GW-MW11A-022611	DSY-GW-MW11A-022611-D	DSY-GW-MW11A-022611-AVG	DSY-GW-MW12-030311	DSY-GW-MW204-031711
TARGET AREA				NORTHERN WATERFRONT	NORTHERN WATERFRONT	BLDG. 234 AREA	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	HUTS 1 AND 2
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM
VOLATILES (UG/L) Cont.											
DICHLORODIFLUOROMETHANE				1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	700	700	700	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ISOPROPYLBENZENE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
M+P-XYLENES	10000		10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
METHYL ACETATE				1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
METHYL CYCLOHEXANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYL TERT-BUTYL ETHER		40	40	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYLENE CHLORIDE	5	5	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
O-XYLENE	10000		10000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
STYRENE	100	100	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	5	5	5	0.5 U	0.696 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOLUENE	1000	1000	1000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOTAL 1,2-DICHLOROETHENE				0.291 J	0.5 U	12.7	0.953 J	1.04 J	0.996 J	8.54	0.5 U
TOTAL XYLENES	10000	10000	10000	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
TRANS-1,2-DICHLOROETHENE	100	100	100	0.5 U	0.5 U	0.5 U	0.669 J	0.683 J	0.676 J	4.81	0.5 U
TRANS-1,3-DICHLOROPROPENE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	5	5	5	0.5 U	7.35	3.9	5.15	4.97	5.06	9.61	3.16
TRICHLOROFLUOROMETHANE				1 U	1 U	0.581 J	1 U	1 U	1 U	1 U	1 U
VINYL CHLORIDE	2	2	2	0.5 U	0.5 U	0.263 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
POLYCYCLIC AROMATIC HYDROCARBONS (UG/L)											
2-METHYLNAPHTHALENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
ACENAPHTHENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
ACENAPHTHYLENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
ANTHRACENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
BENZO(A)ANTHRACENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
BENZO(A)PYRENE	0.2	0.2	0.2	NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
BENZO(B)FLUORANTHENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
BENZO(G,H,I)PERYLENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
BENZO(K)FLUORANTHENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
CHRYSENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
DIBENZO(A,H)ANTHRACENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U

BLACK SHADING-EXCEEDS MINIMUM CRITERION; GRAY SHADING-DETECTED;U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

APPENDIX E - 3

**ANALYTICAL RESULTS - GROUNDWATER
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 3 of 8**

SAMPLE ID				DSY-GW-MW02A-022411	DSY-GW-MW03-022411	DSY-GW-MW08-030111	DSY-GW-MW11A-022611	DSY-GW-MW11A-022611-D	DSY-GW-MW11A-022611-AVG	DSY-GW-MW12-030311	DSY-GW-MW204-031711
TARGET AREA				NORTHERN WATERFRONT	NORTHERN WATERFRONT	BLDG. 234 AREA	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	HUTS 1 AND 2
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM
POLYCYCLIC AROMATIC HYDROCARBONS (UG/L) Cont.											
FLUORANTHENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
FLUORENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
INDENO(1,2,3-CD)PYRENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
NAPHTHALENE		20	20	NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
PHENANTHRENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
PYRENE				NA	NA	0.0926 U	NA	NA	NA	NA	0.0962 U
METALS (UG/L)											
ALUMINUM				NA	NA	53.7	NA	NA	NA	NA	337
ANTIMONY	6	6	6	NA	NA	2 U	NA	NA	NA	NA	2 U
ARSENIC	10		10	NA	NA	1.32 J	NA	NA	NA	NA	1.5 UJ
BARIUM	2000	2000	2000	NA	NA	17	NA	NA	NA	NA	11.6
BERYLLIUM	4	4	4	NA	NA	0.5 U	NA	NA	NA	NA	0.5 U
CADMIUM	5	5	5	NA	NA	0.286 J	NA	NA	NA	NA	0.5 U
CALCIUM				NA	NA	46800	NA	NA	NA	NA	29100 J
CHROMIUM	100	100	100	NA	NA	1 U	NA	NA	NA	NA	0.508 J
COBALT				NA	NA	1.74 J	NA	NA	NA	NA	2.5 U
COPPER	1300		1300	NA	NA	1.57 J	NA	NA	NA	NA	2 U
IRON				NA	NA	459	NA	NA	NA	NA	605 J
LEAD	15	15	15	NA	NA	0.75 U	NA	NA	NA	NA	0.75 U
MAGNESIUM				NA	NA	9790	NA	NA	NA	NA	7110 J
MANGANESE				NA	NA	532	NA	NA	NA	NA	53.9
MERCURY	2	2	2	NA	NA	0.2 U	NA	NA	NA	NA	0.2 U
NICKEL		100	100	NA	NA	2.08 J	NA	NA	NA	NA	3.38
POTASSIUM				NA	NA	5120	NA	NA	NA	NA	1660
SELENIUM	50	50	50	NA	NA	1.25 U	NA	NA	NA	NA	1.25 U
SILVER				NA	NA	0.5 U	NA	NA	NA	NA	0.5 U
SODIUM				NA	NA	111000	NA	NA	NA	NA	40100
THALLIUM	2	2	2	NA	NA	1 U	NA	NA	NA	NA	1 U
VANADIUM				NA	NA	2.5 U	NA	NA	NA	NA	2.5 U
ZINC				NA	NA	29.8 J	NA	NA	NA	NA	6.65

APPENDIX E - 3

ANALYTICAL RESULTS - GROUNDWATER
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID				DSY-GW-MW02A-022411	DSY-GW-MW03-022411	DSY-GW-MW08-030111	DSY-GW-MW11A-022611	DSY-GW-MW11A-022611-D	DSY-GW-MW11A-022611-AVG	DSY-GW-MW12-030311	DSY-GW-MW204-031711
TARGET AREA				NORTHERN WATERFRONT	NORTHERN WATERFRONT	BLDG. 234 AREA	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	HUTS 1 AND 2
LOCATION ID				DSY-MW02A	DSY-MW03	DSY-MW08	DSY-MW11A	DSY-MW11A	DSY-MW11A	DSY-MW12	DSY-MW204
SAMPLE DATE				02/24/11	02/24/11	03/01/11	02/26/11	02/26/11	02/26/11	03/03/11	03/17/11
SACODE				NORMAL	NORMAL	NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	NM	NM	FD	NM	NM	NM
DISSOLVED METALS (UG/L)											
ALUMINUM				NA	NA	36.6 J	NA	NA	NA	NA	72
ANTIMONY	6	6	6	NA	NA	2 U	NA	NA	NA	NA	2 U
ARSENIC	10		10	NA	NA	1.37 J	NA	NA	NA	NA	1.5 UJ
BARIUM	2000	2000	2000	NA	NA	16.1	NA	NA	NA	NA	11.5
BERYLLIUM	4	4	4	NA	NA	0.5 U	NA	NA	NA	NA	0.5 U
CADMIUM	5	5	5	NA	NA	0.274 J	NA	NA	NA	NA	0.5 U
CALCIUM				NA	NA	47800	NA	NA	NA	NA	30800 J
CHROMIUM	100	100	100	NA	NA	1 U	NA	NA	NA	NA	1 U
COBALT				NA	NA	1.78 J	NA	NA	NA	NA	2.5 U
COPPER	1300		1300	NA	NA	1.17 J	NA	NA	NA	NA	1.19 J
IRON				NA	NA	423	NA	NA	NA	NA	50.5 J
LEAD	15	15	15	NA	NA	0.75 U	NA	NA	NA	NA	0.75 U
MAGNESIUM				NA	NA	9790	NA	NA	NA	NA	7450 J
MANGANESE				NA	NA	531	NA	NA	NA	NA	53.3
MERCURY	2	2	2	NA	NA	0.2 U	NA	NA	NA	NA	0.2 U
NICKEL		100	100	NA	NA	1.75 J	NA	NA	NA	NA	3.39
POTASSIUM				NA	NA	5010	NA	NA	NA	NA	1770
SELENIUM	50	50	50	NA	NA	1.25 U	NA	NA	NA	NA	1.25 U
SILVER				NA	NA	0.5 U	NA	NA	NA	NA	0.5 U
SODIUM				NA	NA	114000	NA	NA	NA	NA	42300
THALLIUM	2	2	2	NA	NA	1 U	NA	NA	NA	NA	1 U
VANADIUM				NA	NA	2.5 U	NA	NA	NA	NA	2.5 U
ZINC				NA	NA	16.6	NA	NA	NA	NA	6.48

APPENDIX E - 3

ANALYTICAL RESULTS - GROUNDWATER
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID				DSY-GW-MW218-030111	DSY-GW-MW219-031611	DSY-GW-MW219-031611-D	DSY-GW-MW219-031611-AVG	DSY-GW-MW220-030111	DSY-GW-MW221-030211	DSY-GW-MW222-030211	DSY-GW-MW223-031611
TARGET AREA				BLDG. 42	BLDG. 42	BLDG. 42	BLDG 42	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT (UPGRADIENT LOC.)
LOCATION ID				DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
SAMPLE DATE				03/01/11	03/16/11	03/16/11	03/16/11	03/01/11	03/02/11	03/02/11	03/16/11
SACODE				NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	FD	NM	NM	NM	NM	NM
VOLATILES (UG/L)											
1,1,1-TRICHLOROETHANE	200	200	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	7	7	7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	70	70	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	0.2	0.2	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMOETHANE	0.05	0.05	0.05	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROBENZENE	600	600	600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-DICHLOROBENZENE		600	600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-DICHLOROBENZENE	75	75	75	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-BUTANONE				5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-HEXANONE				2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
4-METHYL-2-PENTANONE				2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
ACETONE				5 U	5 U	3.28 J	2.89 J	5 U	5 U	5 U	5 U
BENZENE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMODICHLOROMETHANE	80		80	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOFORM	80		80	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOMETHANE				1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CARBON TETRACHLORIDE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROBENZENE	100	100	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLORODIBROMOMETHANE	80		80	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROETHANE				1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	80		80	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROMETHANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	70	70	70	0.5 U	0.5 U	0.5 U	0.5 U	4.26	1.49	0.5 U	0.5 U
CIS-1,3-DICHLOROPROPENE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CYCLOHEXANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

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ANALYTICAL RESULTS - GROUNDWATER
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
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SAMPLE ID				DSY-GW-MW218-030111	DSY-GW-MW219-031611	DSY-GW-MW219-031611-D	DSY-GW-MW219-031611-AVG	DSY-GW-MW220-030111	DSY-GW-MW221-030211	DSY-GW-MW222-030211	DSY-GW-MW223-031611
TARGET AREA				BLDG. 42	BLDG. 42	BLDG. 42	BLDG 42	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT (UPGRADIENT LOC.)
LOCATION ID				DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
SAMPLE DATE				03/01/11	03/16/11	03/16/11	03/16/11	03/01/11	03/02/11	03/02/11	03/16/11
SACODE				NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	FD	NM	NM	NM	NM	NM
VOLATILES (UG/L) Cont.											
DICHLORODIFLUOROMETHANE				1 U	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 UJ
ETHYLBENZENE	700	700	700	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ISOPROPYLBENZENE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
M+P-XYLENES	10000		10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
METHYL ACETATE				1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
METHYL CYCLOHEXANE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYL TERT-BUTYL ETHER		40	40	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYLENE CHLORIDE	5	5	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
O-XYLENE	10000		10000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
STYRENE	100	100	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOLUENE	1000	1000	1000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOTAL 1,2-DICHLOROETHENE				0.5 U	0.5 U	0.5 U	0.5 U	5.36	1.49	0.5 U	0.5 U
TOTAL XYLENES	10000	10000	10000	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
TRANS-1,2-DICHLOROETHENE	100	100	100	0.5 U	0.5 U	0.5 U	0.5 U	1.1	0.5 U	0.5 U	0.5 U
TRANS-1,3-DICHLOROPROPENE				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	5	5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12.2	5.48	0.5 U
TRICHLOROFLUOROMETHANE				1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
VINYL CHLORIDE	2	2	2	0.5 U	0.5 U	0.5 U	0.5 U	1.47	0.5 U	0.5 U	0.5 U
POLYCYCLIC AROMATIC HYDROCARBONS (UG/L)											
2-METHYLNAPHTHALENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
ACENAPHTHENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
ACENAPHTHYLENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
ANTHRACENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
BENZO(A)ANTHRACENE				0.221 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
BENZO(A)PYRENE	0.2	0.2	0.2	0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
BENZO(B)FLUORANTHENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
BENZO(K)FLUORANTHENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
CHRYSENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA

BLACK SHADING-EXCEEDS MINIMUM CRITERION; GRAY SHADING-DETECTED;U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

APPENDIX E - 3

ANALYTICAL RESULTS - GROUNDWATER
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID				DSY-GW-MW218-030111	DSY-GW-MW219-031611	DSY-GW-MW219-031611-D	DSY-GW-MW219-031611-AVG	DSY-GW-MW220-030111	DSY-GW-MW221-030211	DSY-GW-MW222-030211	DSY-GW-MW223-031611
TARGET AREA				BLDG. 42	BLDG. 42	BLDG. 42	BLDG 42	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT (UPGRADIENT LOC.)
LOCATION ID				DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
SAMPLE DATE				03/01/11	03/16/11	03/16/11	03/16/11	03/01/11	03/02/11	03/02/11	03/16/11
SACODE				NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	FD	NM	NM	NM	NM	NM
POLYCYCLIC AROMATIC HYDROCARBONS (UG/L) Cont.											
FLUORANTHENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
FLUORENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
NAPHTHALENE		20	20	0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
PHENANTHRENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
PYRENE				0.0943 U	0.0943 U	0.0943 U	0.0943 U	NA	NA	NA	NA
METALS (UG/L)											
ALUMINUM				52.9	312	274	293	NA	NA	NA	NA
ANTIMONY	6	6	6	2 U	2 U	2 U	2 U	NA	NA	NA	NA
ARSENIC	10		10	27.8	74.5 J	78.1 J	76.3 J	NA	NA	NA	NA
BARIUM	2000	2000	2000	86.6	34	34.9	34.4	NA	NA	NA	NA
BERYLLIUM	4	4	4	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
CADMIUM	5	5	5	0.5 U	1.53	1.41	1.47	NA	NA	NA	NA
CALCIUM				79700	38400 J	40000 J	39200 J	NA	NA	NA	NA
CHROMIUM	100	100	100	5 U	1 U	1 U	1 U	NA	NA	NA	NA
COBALT				24.8	13.7	14.1	13.9	NA	NA	NA	NA
COPPER	1300		1300	2 U	2 U	2 U	2 U	NA	NA	NA	NA
IRON				11100	61900 J	65800 J	63800 J	NA	NA	NA	NA
LEAD	15	15	15	3.75 U	1.28	1.07	1.18	NA	NA	NA	NA
MAGNESIUM				16700	8090 J	8400 J	8240 J	NA	NA	NA	NA
MANGANESE				9100	4510	4880	4700	NA	NA	NA	NA
MERCURY	2	2	2	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA
NICKEL		100	100	4.64	1.5 U	1.5 U	1.5 U	NA	NA	NA	NA
POTASSIUM				11000	5970	6200	6080	NA	NA	NA	NA
SELENIUM	50	50	50	6.25 U	1.55 J	1.24 J	1.4 J	NA	NA	NA	NA
SILVER				2.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
SODIUM				62700	34400	35400	34900	NA	NA	NA	NA
THALLIUM	2	2	2	6.25 U	5 U	5 U	5 U	NA	NA	NA	NA
VANADIUM				12.5 U	12.5 U	12.5 U	12.5 U	NA	NA	NA	NA
ZINC				3.59 J	1.58 J	1.52 J	1.55 J	NA	NA	NA	NA

APPENDIX E - 3

ANALYTICAL RESULTS - GROUNDWATER
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
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SAMPLE ID				DSY-GW-MW218-030111	DSY-GW-MW219-031611	DSY-GW-MW219-031611-D	DSY-GW-MW219-031611-AVG	DSY-GW-MW220-030111	DSY-GW-MW221-030211	DSY-GW-MW222-030211	DSY-GW-MW223-031611
TARGET AREA				BLDG. 42	BLDG. 42	BLDG. 42	BLDG. 42	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT (UPGRADIENT LOC.)
LOCATION ID				DSY-MW218	DSY-MW219	DSY-MW219	DSY-MW219	DSY-MW220	DSY-MW221	DSY-MW222	DSY-MW223
SAMPLE DATE				03/01/11	03/16/11	03/16/11	03/16/11	03/01/11	03/02/11	03/02/11	03/16/11
SACODE				NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	FEDMCL	RIGAOB	MIN_GW	NM	NM	FD	NM	NM	NM	NM	NM
DISSOLVED METALS (UG/L)											
ALUMINUM				29.7 J	36.9 J	38 J	37.4 J	NA	NA	NA	NA
ANTIMONY	6	6	6	2 U	2 U	2 U	2 U	NA	NA	NA	NA
ARSENIC	10		10	29.1	77.1 J	78.9 J	78 J	NA	NA	NA	NA
BARIUM	2000	2000	2000	84.4	34.4	33.7	34	NA	NA	NA	NA
BERYLLIUM	4	4	4	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
CADMIUM	5	5	5	0.5 U	1.62	1.52	1.57	NA	NA	NA	NA
CALCIUM				76600	39400 J	39000 J	39200 J	NA	NA	NA	NA
CHROMIUM	100	100	100	5 U	1 U	1 U	1 U	NA	NA	NA	NA
COBALT				24.2		13.7	13.6	NA	NA	NA	NA
COPPER	1300		1300	2 U	2 U	2 U	2 U	NA	NA	NA	NA
IRON				9900	63900 J	62600 J	63200 J	NA	NA	NA	NA
LEAD	15	15	15	3.75 U	0.667 J	0.488 J	0.578 J	NA	NA	NA	NA
MAGNESIUM				16200	8260 J	8090 J	8180 J	NA	NA	NA	NA
MANGANESE				8680	4980	4610	4800	NA	NA	NA	NA
MERCURY	2	2	2	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA
NICKEL		100	100	4.73	1.75 U	1.75 U	1.75 U	NA	NA	NA	NA
POTASSIUM				10800	6390	6240	6320	NA	NA	NA	NA
SELENIUM	50	50	50	6.25 U	1.34 J	1.44 J	1.39 J	NA	NA	NA	NA
SILVER				2.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
SODIUM				61900	35800	35900	35800	NA	NA	NA	NA
THALLIUM	2	2	2	6.25 U	5 U	5 U	5 U	NA	NA	NA	NA
VANADIUM				12.5 U	12.5 U	12.5 U	12.5 U	NA	NA	NA	NA
ZINC				3.5 J	2.5 U	2.5 U	2.5 U	NA	NA	NA	NA

E-4 SOIL-GAS SAMPLE ANALYTICAL DATA

APPENDIX E - 4

ANALYTICAL RESULTS - SOIL-GAS
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 of 2

SAMPLE ID			DSY-SG-MW02A-0708	DSY-SG-MW03-0608	DSY-SG-MW03-0608-D	DSY-SG-MW03-0608-AVG	DSY-SG-MW11A-0203	DSY-SG-MW12-0506
TARGET AREA			NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT
LOCATION ID			DSY-MW02A	DSY-MW03	DSY-MW03	DSY-MW03	DSY-MW11A	DSY-MW12
SAMPLE DATE			02/24/11	02/24/11	02/24/11	02/24/11	03/03/11	03/03/11
SACODE			NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
QC TYPE	VISGR1	VISGR01	NM	NM	FD	NM	NM	NM
VOLATILES (UG/M3)								
1,1,1-TRICHLOROETHANE	52000	520000	0.1 J	0.26	0.26	0.26	0.11 J	0.055 J
1,1,2,2-TETRACHLOROETHANE	0.42	4.2	0.027 U	0.028 U	0.028 U	0.028 U	0.031 U	0.034 U
1,1,2-TRICHLOROETHANE	1.5	15	0.027 U	0.028 U	0.028 U	0.028 U	0.031 U	0.034 U
1,1,2-TRICHLOROTRIFLUOROETHANE	310000	3100000	0.79 J	0.5 J	0.53 J	0.515 J	0.6 J	0.57 J
1,1-DICHLOROETHANE	15	150	0.25	0.16	0.076 J	0.118 J	0.11 J	0.086 J
1,1-DICHLOROETHENE	2100	21000	0.013 U	0.014 U	0.014 U	0.014 U	0.016 U	0.017 U
1,2,4-TRICHLOROBENZENE	21	210	2 U	2 U	2 U	2 U	2.3 U	2.5 U
1,2,4-TRIMETHYLBENZENE	73	730	0.38 J	2.4 J	0.35 UJ	1.29 J	0.58 J	1
1,2-DIBROMOETHANE	0.041	0.41	0.51 U	0.53 U	0.53 U	0.53 U	0.59 U	0.64 U
1,2-DICHLOROBENZENE	2100	21000	0.4 U	0.42 U	0.42 U	0.42 U	0.46 U	0.5 U
1,2-DICHLOROETHANE	0.94	9.4	0.013 U	0.014 U	0.014 U	0.014 U	0.016 U	0.017 U
1,2-DICHLOROPROPANE	2.4	24	0.31 U	0.32 U	0.32 U	0.32 U	0.36 U	0.39 U
1,2-DICHLOROTETRAFLUOROETHANE			0.47 U	0.49 U	0.49 U	0.49 U	0.54 U	0.59 U
1,3,5-TRIMETHYLBENZENE			0.34 U	1.1	0.35 U	0.638	0.39 U	0.3 J
1,3-BUTADIENE	0.81	8.1	3.1	2.3	2.3	2.3	13	6.4
1,3-DICHLOROBENZENE			0.4 U	0.42 U	0.42 U	0.42 U	0.46 U	0.5 U
1,4-DICHLOROBENZENE	2.2	22	0.4 U	0.42 U	0.42 U	0.42 U	0.46 U	0.5 U
1-ETHYL-4-METHYL BENZENE			0.36 J	1.5 J	0.35 UJ	0.838 J	0.47 J	1
2-BUTANONE	52000	520000	3.3	6.1	5.2	5.65	17	11
2-HEXANONE	310	3100	0.28 J	1.1 U	1.1 U	1.1 U	0.83 J	1 J
3-CHLOROPROPENE	10	100	2.1 U	0.88 U	0.88 U	0.88 U	0.98 U	1 U
4-METHYL-2-PENTANONE	31000	310000	0.87	0.26 J	0.21 J	0.235 J	0.84	0.97
ACRYLONITRILE	0.36	3.6	1.4 U	1.5 U	1.5 U	1.5 U	2.8	1.8 U
BENZENE	3.1	31	5.2	0.71	0.67	0.69	6.8	4.8
BENZYL CHLORIDE	0.5	5	0.35 U	0.36 U	0.36 U	0.36 U	0.4 U	0.44 U
BROMODICHLOROMETHANE	0.66	6.6	0.46 U	0.47 U	0.47 U	0.47 U	0.53 U	0.57 U
BROMOETHENE	0.76	7.6	2.9 U	3 U	3 U	3 U	3.4 U	3.7 U
BROMOFORM	22	220	0.7 U	0.72 U	0.72 U	0.72 U	0.81 U	0.87 U
BROMOMETHANE	52	520	0.47 U	0.49 U	0.49 U	0.49 U	0.54 U	0.59 U
CARBON TETRACHLORIDE	4.1	41	0.42 U	0.43 U	0.43 U	0.43 U	0.48 U	0.52 U
CHLOROBENZENE	520	5200	0.31 U	0.32 U	0.32 U	0.32 U	0.3 J	0.17 J
CHLORODIBROMOMETHANE	0.9	9	0.58 U	0.6 U	0.6 U	0.6 U	0.67 U	0.72 U
CHLOROETHANE	100000	1000000	0.17 U	0.18 U	0.18 U	0.18 U	1.3 J	0.6 J
CHLOROFORM	1.1	11	0.18 J	0.14 J	0.15 J	0.145 J	0.7 J	0.27 J
CHLOROMETHANE	940	9400	0.13 U	0.14 U	0.14 U	0.14 U	4.9	1.3
CIS-1,2-DICHLOROETHENE			0.14	0.062 J	0.014 U	0.0345 J	27	0.017 U
CIS-1,3-DICHLOROPROPENE			0.31 U	0.32 U	0.32 U	0.32 U	0.36 U	0.39 U
CYCLOHEXANE	63000	630000	1.8	0.24 U	0.24 U	0.24 U	0.3 J	0.44 J
DICHLORODIFLUOROMETHANE	2100	21000	2.2	3	3	3	2.4	2
ETHYLBENZENE	9.7	97	1.1	0.25 J	0.13 J	0.19 J	0.57	0.92
HEXACHLOROBUTADIENE		11	2.8 U	3 U	3 U	3 U	3.3 U	3.6 U
HEXANE	7300	73000	4.8	2.1	1.7	1.9	3.4	3

APPENDIX E - 4

ANALYTICAL RESULTS - SOIL-GAS
SITE 19, ON-SHORE DERECKTOR SHIPYARD, SASE ADDENDUM
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 of 2

SAMPLE ID			DSY-SG-MW02A-0708	DSY-SG-MW03-0608	DSY-SG-MW03-0608-D	DSY-SG-MW03-0608-AVG	DSY-SG-MW11A-0203	DSY-SG-MW12-0506
TARGET AREA			NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT	NORTHERN WATERFRONT
LOCATION ID			DSY-MW02A	DSY-MW03	DSY-MW03	DSY-MW03	DSY-MW11A	DSY-MW12
SAMPLE DATE			02/24/11	02/24/11	02/24/11	02/24/11	03/03/11	03/03/11
SACODE			NORMAL	ORIG	DUP	AVG	NORMAL	NORMAL
QC TYPE	VISGR1	VISGR01	NM	NM	FD	NM	NM	NM
VOLATILES (UG/M3) Cont.								
M+P-XYLENES			0.87	0.73 J	0.15 J	0.44 J	0.81	1.7
METHYL TERT-BUTYL ETHER	94	940	0.0085 J	0.014 U	0.014 U	0.014 U	0.016 U	0.015 J
METHYLENE CHLORIDE	52	520	0.23 U	1.5	0.65 J	1.08 J	0.8 J	1 J
N-HEPTANE			1.8	0.47 J	0.6	0.535 J	1.6	2.7
O-XYLENE	7300	73000	0.34	0.58 J	0.064 J	0.322 J	0.41	0.8
STYRENE	10000	100000	0.28 U	0.29 U	0.29 U	0.29 U	0.69	0.43 J
TETRACHLOROETHENE	4.1	41	4.7	1	1.1	1.05	12	1.5
TETRAHYDROFURAN			0.79 U	0.82 U	0.82 U	0.82 U	0.91 U	0.99 U
TOLUENE	52000	520000	7.2	0.8	0.67	0.735	2.6	3.5
TOTAL 1,2-DICHLOROETHENE			0.14	0.062 J	0.014 U	0.0345 J	31.1	0.017 U
TOTAL XYLENES	1000	10000	1.21	1.31 J	0.214 J	0.762 J	1.22	2.5
TRANS-1,2-DICHLOROETHENE	630	6300	0.013 U	0.014 U	0.014 U	0.014 U	4.1	0.017 U
TRANS-1,3-DICHLOROPROPENE			0.31 U	0.32 U	0.32 U	0.32 U	0.36 U	0.39 U
TRICHLOROETHENE	12	120	0.088 J	7.7	7.8	7.75	120	1.3
TRICHLOROFLUOROMETHANE	7300	73000	1.9	1.8	1.8	1.8	1.8	7.4
VINYL CHLORIDE	1.6	16	0.76	0.39 J	0.15 J	0.27 J	0.49	0.32

E-5 DATA VALIDATION MEMORANDUM



TETRA TECH NUS, INC.

RECORD OF REVIEW

1. TITLE AS IT APPEARS ON THE DOCUMENT – (See instruction #1 on reverse for definition of Documents):

DV Memo to T. Campbell, CTOWE20, On-Shore Derecktor Shipyard, Site 19, Naval Station Newport, Newport, Rhode Island

Tier II Inorganic Data Validation, SDG CTOWE20_005

2. DATE OF DOCUMENT: 5/3/11

DOCUMENT CONTROL No.: C-Navy-05-11-4328W

AUTHORS: J. Cardinal

TINUS JOB CHARGE No.: 112G02125-SA.DV

TYPE (DRAFT, DRAFT FINAL, FINAL): Final

SUBMITTAL DATE:

3. REVIEWER AND STATUS

REVIEWERS ASSIGNED BY:

Date

Assigned Reviewer (See Instruction #3)	Disapproval		Approved with Suggestions		Reviewer Requires Final Verification		Approved By	
	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) <i>Lucy Guzman</i>							<i>JP</i>	5/3/11
b)								
c)								
d)								

4. COMMENTS (Explain conditions and comments, or state where comments and edits are provided. Attach additional pages as needed):

5. AUTHOR COMMENTS/RESOLUTION:

6. APPROVAL FOR TRANSMITTAL:

See #7 on Reverse for Authority to Approve Transmittals

DATE: _____



TETRA TECH NUS, INC

INTERNAL CORRESPONDENCE

C-NAVY-04-11-4328W

Date: May 03, 2011

c: File G02125-4.10 (w/enc.-original)

To: T. Campbell (w/o enc.)

From: J. Cardinal (no copy)

Subject: Tier II Inorganic Data Validation, SDG CTOWE20_005
Empirical Laboratories, LLC
CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,
NAVSTA Newport, Newport, Rhode Island

Total and Dissolved Metals:

3/Groundwaters/	DSY-GW-DUP02-031611	DSY-GW-MW204-031711
	DSY-GW-MW219-031611	

(Field Duplicate Pair: DSY-GW-MW219-031611/DSY-GW-DUP02-031611)

1/Rinsate Blank/ DSY-GW-RB01-031611

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the target analyte list (TAL) metals analytical data for the samples in this SDG. The samples were collected as part of a Study Area Screening Evaluation at On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, Rhode Island on March 16 and 17, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The total and dissolved metal analyses were performed according to USEPA SW-846 Methods 6010C/7470A. The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs) listed in Table A-1. The data user should consider the most recent revisions to the applicable regulatory limits. The data validation was performed in accordance with the Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, Part IV, November 2008.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- * • Holding Times
- Calibration Verification
- * • Laboratory Blank Analyses
- * • ICP Interference Check Sample Results
- * • Matrix Spike Results
- * • Laboratory Duplicate Results
- * • Laboratory Control Sample Results

- * • Field Duplicate Precision
- NA • ICP Serial Dilution Results
- Limits of Detection

* All quality control criteria were met for this parameter.
NA Not applicable for this SDG.

Laboratory Data Completeness

The laboratory mistakenly logged in sample DSY-GW-MW204-**031711** with the suffix "-031611" and the sample date 3/16/11 (actual sample date is 3/17/11). On April 25, 2011 the laboratory resubmitted all affected forms to correct the sample ID and sample date.

Calibration Verification

The following table summarizes the analytes that recovered below the 90% recovery QC limit in the continuing calibration verification:

Analyte	%R	Action		Affected Samples
		(+)	NDs	
Arsenic	88.8	J	UJ	All total and dissolved metals samples
Calcium	89.2	J	UJ	
Iron	88.7	J	UJ	
Magnesium	86.8, 86.2	J	UJ	

The recovery of arsenic was below the QC limit in the continuing calibration verification; therefore, the project accuracy goals may be impacted. The positive and non-detected arsenic results in all samples are usable as estimated values which may be biased low.

Although the recoveries of calcium, iron, and magnesium were below the QC limit in the continuing calibration verification, the project accuracy goals are not impacted since there are no project action limits established for these metals for the groundwater samples. The positive and non-detected calcium, iron, and magnesium results in all samples are usable as estimated values which may be biased low.

Limits of Detection

The laboratory reported non-detected metals results at the limit of detection (LOD). The positive results below the laboratory's limit of quantitation (LOQ) and above the detection limit (DL) are estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

In select samples, the nickel, silver, and/or chromium reporting limits were raised due to matrix interferences.

All PALs for the groundwater samples were met by the LODs except for thallium in select samples due to dilution. Data usability may be impacted for thallium.

Analytical Data Usability Assessment

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

The project goals with respect to accuracy were met for the metals data set with the following exception. Arsenic was qualified as estimated in all samples due to a low continuing calibration verification recovery; the affected results may be biased low. Although specific method criteria were not met in this instance, the affected positive and non-detected results are usable as estimated values which may have a minor impact on data usability. In addition, calcium, iron, and magnesium were qualified as estimated in all samples due to low continuing calibration verification recoveries. Although specific method criteria were not met in this instance, data usability is not impacted and the affected positive and non-detected results are usable as estimated values.

The project goals with respect to sensitivity were met for the metals data set with the following exception. All PALs for the groundwater samples were met by the LODs except for thallium in select samples due to dilution. Data usability may be impacted for thallium.

The project goals with respect to precision and laboratory data completeness were met for the metals data set. Data usability is not impacted with regards to precision and laboratory data completeness.

Tables: Data Validation Qualifiers and Codes
 Data Summary Tables

Enclosures: Data Validation Worksheets

Data Validation Qualifiers and Codes

Data Validation Qualifiers:

- = No qualifier attached to value (positive hit)
- J = Value is estimated
- U = Value is not detected
- UJ = Value is not detected and estimated
- R = Value (positive hit) is not usable
- UR = Value was reported as ND but is not usable

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- O = Poor Instrument Performance (e.g. base-line drifting)
- P = Uncertainty below quantitation limit ($< QL$ but $\geq MDL$)
- Q = Other problems (can encompass a number of issues; e.g. chromatography, interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = % Difference between columns/detectors $>25\%$ for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids $<30\%$
- Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125 SDG: CTOWE20_005 FRACTION: M MEDIA: WATER	NSAMPLE	DSY-GW-DUP02-031611			DSY-GW-MW204-031711			DSY-GW-MW219-031611			DSY-GW-RB01-031611		
	LAB_ID	1103179-01			1103179-09			1103179-03			1103179-05		
	SAMP_DATE	3/16/2011			3/17/2011			3/16/2011			3/16/2011		
	QC_TYPE	FD			NM			NM			RB		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF	DSY-GW-MW219-031611											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		274			337			312			25	U	
ANTIMONY		2	U		2	U		2	U		2	U	
ARSENIC		78.1	J	C	1.5	UJ	C	74.5	J	C	1.5	UJ	C
BARIUM		34.9			11.6			34			2.5	U	
BERYLLIUM		0.5	U		0.5	U		0.5	U		0.5	U	
CADMIUM		1.41			0.5	U		1.53			0.5	U	
CALCIUM		40000	J	C	29100	J	C	38400	J	C	500	UJ	C
CHROMIUM		1	U		0.508	J	P	1	U		1	U	
COBALT		14.1			2.5	U		13.7			2.5	U	
COPPER		2	U		2	U		2	U		2	U	
IRON		65800	J	C	605	J	C	61900	J	C	11	J	CP
LEAD		1.07			0.75	U		1.28			0.75	U	
MAGNESIUM		8400	J	C	7110	J	C	8090	J	C	750	UJ	C
MANGANESE		4880			53.9			4510			0.959	J	P
MERCURY		0.2	U		0.2	U		0.2	U		0.2	U	
NICKEL		1.5	U		3.38			1.5	U		1.5	U	
POTASSIUM		6200			1660			5970			750	U	
SELENIUM		1.24	J	P	1.25	U		1.55	J	P	1.25	U	
SILVER		0.5	U		0.5	U		0.5	U		0.5	U	
SODIUM		35400			40100			34400			750	U	
THALLIUM		5	U		1	U		5	U		1	U	
VANADIUM		12.5	U		2.5	U		12.5	U		2.5	U	
ZINC		1.52	J	P	6.65			1.58	J	P	1.29	J	P

PROJ_NO: 02125 SDG: CTOWE20_005 FRACTION: MF MEDIA: WATER	NSAMPLE	DSY-GW-DUP02-031611			DSY-GW-MW204-031711			DSY-GW-MW219-031611			DSY-GW-RB01-031611		
	LAB_ID	1103179-02			1103179-10			1103179-04			1103179-06		
	SAMP_DATE	3/16/2011			3/17/2011			3/16/2011			3/16/2011		
	QC_TYPE	FD			NM			NM			RB		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF	DSY-GW-MW219-031611											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		38	J	P	72			36.9	J	P	25	U	
ANTIMONY		2	U		2	U		2	U		2	U	
ARSENIC		78.9	J	C	1.5	UJ	C	77.1	J	C	1.5	UJ	C
BARIUM		33.7			11.5			34.4			2.5	U	
BERYLLIUM		0.5	U		0.5	U		0.5	U		0.5	U	
CADMIUM		1.52			0.5	U		1.62			0.5	U	
CALCIUM		39000	J	C	30800	J	C	39400	J	C	500	UJ	C
CHROMIUM		1	U		1	U		1	U		1	U	
COBALT		13.6			2.5	U		13.7			2.5	U	
COPPER		2	U		1.19	J	P	2	U		2	U	
IRON		62600	J	C	50.5	J	C	63900	J	C	15	UJ	C
LEAD		0.488	J	P	0.75	U		0.667	J	P	0.75	U	
MAGNESIUM		8090	J	C	7450	J	C	8260	J	C	750	UJ	C
MANGANESE		4610			53.3			4980			1.5	U	
MERCURY		0.2	U		0.2	U		0.2	U		0.2	U	
NICKEL		1.75	U		3.39			1.75	U		1.5	U	
POTASSIUM		6240			1770			6390			750	U	
SELENIUM		1.44	J	P	1.25	U		1.34	J	P	1.25	U	
SILVER		0.5	U		0.5	U		0.5	U		0.5	U	
SODIUM		35900			42300			35800			750	U	
THALLIUM		5	U		1	U		5	U		1	U	
VANADIUM		12.5	U		2.5	U		12.5	U		2.5	U	
ZINC		2.5	U		6.48			2.5	U		2.5	U	



TETRA TECH NUS, INC.

RECORD OF REVIEW

1. TITLE AS IT APPEARS ON THE DOCUMENT – (See instruction #1 on reverse for definition of Documents):

**DV Memo to T. Campbell, CTOWE20, ON SHORE DERECKTOR SHIPYARD, SITE 19, NAVAL STATION
NEWPORT, NEWPORT, RHODE ISLAND**

Tier II Inorganic Data Validation, SDG CTOWE20_001

2. DATE OF DOCUMENT: 4/4/11

DOCUMENT CONTROL No.: C-Navy-04-11-42694

AUTHORS: J. Cardinal

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Assigned Reviewer (See Instruction #3)	Disapproval		Approved with Suggestions		Reviewer Requires Final Verification		Approved By	
	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) Lucy Guzman							AP	4/7/11
b)								
c)								
d)								

4. COMMENTS (Explain conditions and comments, or state where comments and edits are provided. Attach additional pages as needed):

5. AUTHOR COMMENTS/RESOLUTION:

6. APPROVAL FOR TRANSMITTAL:

DATE: _____

See #7 on Reverse for Authority to Approve Transmittals

**TETRA TECH NUS, INC****INTERNAL CORRESPONDENCE**

C-NAVY-04-11-4269W

Date: April 05, 2011

c: File G02125-4.10 (w/enc.-original)

To: T. Campbell (w/o enc.)

From: J. Cardinal (no copy) 

Subject: Tier II Inorganic Data Validation, SDG CTOWE20_001
Empirical Laboratories, LLC
CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,
NAVSTA Newport, Newport, Rhode Island

Metals:

11/Soils/	DSY-SB201-SO-0204	DSY-SB202-SO-0204
	DSY-SB204-SO-0002	DSY-SB204-SO-0810
	DSY-SB205-SO-0002	DSY-SB205-SO-088.5
	DSY-SB206-SO-0002	DSY-SB206-SO-0810
	DSY-SB207-SO-0002	DSY-SB207-SO-1012
	DSY-SO-DUP01-021411	

(Field Duplicate Pair: DSY-SB204-SO-0002/DSY-SO-DUP01-021411)

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the target analyte list (TAL) metals analytical data for the samples in this SDG. The samples were collected as part of a Study Area Screening Evaluation at On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, Rhode Island from February 9-15, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The metal analyses were performed according to USEPA SW-846 Methods 6010C/7471A. The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs) listed in Table A-2. The data user should consider the most recent revisions to the applicable regulatory limits. The data validation was performed in accordance with the Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, Part IV, November 2008.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- *
 - Laboratory Data Completeness
- *
 - Holding Times
 - Calibration Verification
 - Laboratory Blank Analyses
 - ICP Interference Check Sample Results
 - Matrix Spike Results

- * • Laboratory Duplicate Results
- * • Laboratory Control Sample Results
- * • Field Duplicate Precision
- ICP Serial Dilution Results
- * • Percent Solids
- * • Limits of Detection

* All quality control criteria were met for this parameter.

Calibration Verification

The following table summarizes the analytes that recovered below the 90% recovery QC limit in the continuing calibration verification:

Analyte	%R	Action		Affected Samples
		(+)	NDs	
Lead	88.4	J		All samples except DSY-SB202-SO-0204
Selenium	87.1	J	UJ	
Zinc	87.5	J		

The recovery of lead was below the QC limit in the continuing calibration verification; therefore, the project accuracy goals may be impacted. The positive lead results in the affected samples are usable as estimated values which may be biased low.

Although the recovery of selenium and zinc was below the QC limit in the continuing calibration verification, the project accuracy goals are not impacted since the affected results are more than an order of magnitude below the PAL. The positive and non-detected selenium and zinc results in the affected samples are usable as estimated values which may be biased low.

Laboratory Blank Analyses

The following table summarizes the level of blank contamination detected in the laboratory blanks:

Analyte	Maximum Conc. (mg/kg)	Action Level (mg/kg)*	Affected Sample
Cadmium	0.0597	0.2985	DSY-SB205-SO-0002

*The action level is based on the assumption of 2 g of sample, 100 percent solids, and a dilution factor of 1. The action level is adjusted based on sample-specific preparation factors.

The positive cadmium result below the blank action level and below the limit of detection (LOD) is changed to a non-detected value (U) at the LOD due to laboratory blank contamination.

Although cadmium contamination was found in the laboratory blanks, the project sensitivity goals are not impacted since the affected cadmium result is below the project action limit for. The affected cadmium result in sample DSY-SB205-SO-0002 is usable as a non-detected value.

ICP Interference Check Sample Results

The following results were qualified in the affected samples due to ICP interference attributed to the high concentration of iron in the samples:

Analyte	Action		Bias	Affected Samples
	(+)	ND		
Lead	J		High	DSY-SB201-SO-0204, DSY-SB202-SO-0204, DSY-SB204-SO-0002, DSY-SB204-SO-0810, DSY-SB206-SO-0002, DSY-SB206-SO-0810, DSY-SB207-SO-1012, DSY-SO-DUP01-021411

The positive lead results in the affected samples are qualified as estimated (J) due to positive ICP interference attributed to iron. These results may be biased high.

There were positive ICP interferences attributed to the high concentration of iron that resulted in estimating the positive lead results in the samples listed above; therefore, the project accuracy goals may be impacted. The positive lead results in the affected samples are usable as estimated values which may be biased high.

Matrix Spike Results

The following table summarizes the analyte that recovered outside of the 80-120% recovery QC limits in the matrix spike (MS) analysis of sample DSY-SB202-SO-0204:

Analyte	MS %Recovery	Action	
		(+)	NDs
Antimony	35.1		UJ
Copper	69.2	J	
Potassium	78.7	J	
Zinc	68.5	J	

The positive and non-detected antimony, copper, potassium, and zinc results are estimated (J, UJ) in all samples due to low MS recoveries.

Although the MS percent recovery criteria were not met for antimony, copper, potassium, and zinc; the project accuracy goals are not impacted since there are no project action limits established for potassium for the soil samples and the affected antimony, copper, and zinc sample results are more than an order of magnitude below the PALs. The positive and non-detected antimony, copper, potassium, and zinc results in all samples are usable as estimated values which may be biased low.

ICP Serial Dilution Results

The following table summarizes the results in the ICP serial dilution analysis of sample DSY-SB202-SO-0204 for which the percent difference between the initial and diluted results was above the 10% QC criterion when the initial sample result was above 50 times the method detection limit (MDL):

Analyte	% Difference	Bias	Action	
			(+)	NDs
Manganese	12.5	Low	J	

The positive manganese results are estimated (J) in all samples. Since the initial sample result was lower than the diluted result, the affected sample results may be biased low.

A sample matrix suppressing effect for manganese was detected in the ICP serial dilution analysis; therefore, the project accuracy goals may be impacted. The positive manganese results in all samples are usable as estimated values which may be biased low.

Limits of Detection

The laboratory reported non-detected metals results down to the limit of detection (LOD). The positive results below the laboratory's limit of quantitation (LOQ) and above the detection limit (DL) are estimated (J) due to uncertainty below the LOQ.

Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

All PALs for the soil samples were met by the LODs.

For select samples, the detection limits for silver and/or thallium were raised due to interferences. Data usability is not impacted for silver and thallium since the LODs are less than the PALs.

Cadmium in sample DSY-SB205-SO-0002 was changed to a non-detected value due to blank contamination. As discussed above in the Laboratory Blank Analyses section, data usability is not impacted.

Analytical Data Usability Assessment

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

The project goals with respect to accuracy were met for the metals data set with the following exceptions. Lead was qualified as estimated in select samples due to a low continuing calibration verification recovery; however, lead was also qualified as estimated in select samples due to positive ICP interference; consequently, the bias for the lead results is indeterminate. Manganese was qualified as estimated in all samples due to a matrix suppressing effect detected in the ICP serial dilution; the affected results may be biased low. Although specific method criteria were not met in these instances, the affected positive results are usable as estimated values which may have a minor impact on data usability. Selenium and zinc were qualified as estimated in select samples due to low continuing calibration verification recoveries. Antimony, copper, potassium, and zinc were qualified as estimated in all samples due to low MS recoveries. Although specific method criteria were not met in these instances, data usability is not impacted and the affected positive and non-detected results are usable as estimated values.

The project goals with respect to precision, sensitivity, and laboratory data completeness were met for the metals data set. Data usability is not impacted with regards to precision, sensitivity, and laboratory data completeness.

Memo to T. Campbell
April 05, 2011
Page 5

Tables: Data Validation Qualifiers and Codes
 Data Summary Tables

Enclosures: Data Validation Worksheets

Data Validation Qualifiers and Codes

Data Validation Qualifiers:

- = No qualifier attached to value (positive hit)
- J = Value is estimated
- U = Value is not detected
- UJ = Value is not detected and estimated
- R = Value (positive hit) is not usable
- UR = Value was reported as ND but is not usable

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- O = Poor Instrument Performance (e.g. base-line drifting)
- P = Uncertainty below quantitation limit ($< QL$ but $\geq MDL$)
- Q = Other problems (can encompass a number of issues; e.g. chromatography, interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = % Difference between columns/detectors $>25\%$ for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids $<30\%$
- Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: M MEDIA: SOIL	NSAMPLE	DSY-SB201-SO-0204			DSY-SB202-SO-0204			DSY-SB204-SO-0002			DSY-SB204-SO-0810		
	LAB_ID	1102160-02			1102160-01			1102160-05			1102160-03		
	SAMP_DATE	2/11/2011			2/9/2011			2/14/2011			2/11/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	88.1			90.6			91.5			93.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		17400			15900			5740			3290		
ANTIMONY		0.912	UJ	D	0.858	UJ	D	0.441	UJ	D	0.425	UJ	D
ARSENIC		15.9			26.3			3.35			3.62		
BARIUM		14.6			14.8			6.46			4.5		
BERYLLIUM		0.418	J	P	0.392	J	P	0.243	J	P	0.176	J	P
CADMIUM		0.228	U		0.214	U		0.11	U		0.106	U	
CALCIUM		1770			1000			1710			443		
CHROMIUM		21.2			18.2			9.16			4.98		
COBALT		17.9			21.1			4.55			5.15		
COPPER		29.9	J	D	28.2	J	D	8.07	J	D	4.42	J	D
IRON		44400			45500			16100			9830		
LEAD		9.49	J	CK	13.6	J	K	4.18	J	CK	1.96	J	CK
MAGNESIUM		5220			4850			2120			1110		
MANGANESE		488	J	I	681	J	I	148	J	I	169	J	I
MERCURY		0.0351	U		0.0312	U		0.0292	U		0.0331	U	
NICKEL		38.6			37.9			12.2			9.68		
POTASSIUM		243	J	DP	257	J	DP	271	J	DP	219	J	DP
SELENIUM		0.57	UJ	C	0.536	U		0.276	UJ	C	0.16	J	CP
SILVER		0.228	U		0.214	U		0.11	U		0.106	U	
SODIUM		342	U		322	U		166	U		160	U	
THALLIUM		0.57	U		0.536	U		0.276	U		0.213	U	
VANADIUM		18.6			17.7			10.3			5.82		
ZINC		72.8	J	CD	75.7	J	D	28.1	J	CD	17.9	J	CD

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: M MEDIA: SOIL	NSAMPLE	DSY-SB205-SO-0002			DSY-SB205-SO-088.5			DSY-SB206-SO-0002			DSY-SB206-SO-0810		
	LAB_ID	1102160-09			1102160-10			1102160-06			1102160-07		
	SAMP_DATE	2/15/2011			2/15/2011			2/14/2011			2/14/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.7			93.3			93.0			94.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		9650			5790			5850			3190		
ANTIMONY		0.915	UJ	D	0.84	UJ	D	0.437	UJ	D	0.43	UJ	D
ARSENIC		9.81			7.42			2.41			4.44		
BARIUM		33.2			8.85			11.6			4.43		
BERYLLIUM		0.658			0.314	J	P	0.38			0.204	J	P
CADMIUM		0.229	UJ	AP	0.21	U		0.109	U		0.108	U	
CALCIUM		2290			1020			695			429		
CHROMIUM		16.1			9.49			9.79			5.27		
COBALT		9.56			4.54			3.94			3.68		
COPPER		39.1	J	D	12.5	J	D	6.65	J	D	5.25	J	D
IRON		27100			18300			13900			12200		
LEAD		50.6	J	C	13.8	J	C	3.38	J	CK	2.81	J	CK
MAGNESIUM		2680			1830			2300			1110		
MANGANESE		337	J	I	145	J	I	155	J	I	95.7	J	I
MERCURY		0.037			0.0125	J	P	0.038	U		0.03	U	
NICKEL		21.4			12.5			12			8.8		
POTASSIUM		614	J	D	248	J	DP	639	J	D	188	J	DP
SELENIUM		0.572	UJ	C	0.525	UJ	C	0.273	UJ	C	0.269	UJ	C
SILVER		0.229	U		0.21	U		0.109	U		0.108	U	
SODIUM		343	U		315	U		164	U		161	U	
THALLIUM		0.457	U		0.42	U		0.273	U		0.215	U	
VANADIUM		21.1			11			9.48			6.12		
ZINC		77	J	CD	36	J	CD	26.2	J	CD	21.9	J	CD

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: M MEDIA: SOIL	NSAMPLE	DSY-SB207-SO-0002			DSY-SB207-SO-1012			DSY-SO-DUP01-021411		
	LAB_ID	1102160-11			1102160-12			1102160-08		
	SAMP_DATE	2/15/2011			2/15/2011			2/14/2011		
	QC_TYPE	NM			NM			FD		
	UNITS	MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	93.7			88.7			90.1		
	DUP_OF							DSY-SB204-SO-0002		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		6720			6100			5380		
ANTIMONY		0.833	UJ	D	0.88	UJ	D	0.444	UJ	D
ARSENIC		6.16			9.79			3.57		
BARIUM		18.2			5.11			6.2		
BERYLLIUM		0.462	J	P	0.34	J	P	0.234	J	P
CADMIUM		0.208	U		0.22	U		0.111	U	
CALCIUM		715			496	J	P	650		
CHROMIUM		9.58			8.77			8.14		
COBALT		6.42			5.85			4.05		
COPPER		21.6	J	D	11.7	J	D	7.7	J	D
IRON		19600			20900			14700		
LEAD		24.9	J	C	8.23	J	CK	3.95	J	CK
MAGNESIUM		2100			1850			1940		
MANGANESE		149	J	I	171	J	I	135	J	I
MERCURY		0.0204	J	P	0.031	U		0.0379	U	
NICKEL		15.8			15			11.5		
POTASSIUM		318	J	DP	161	J	DP	287	J	D
SELENIUM		0.52	UJ	C	0.55	UJ	C	0.277	UJ	C
SILVER		0.208	U		0.22	U		0.111	U	
SODIUM		312	U		330	U		166	U	
THALLIUM		0.416	U		0.44	U		0.333	U	
VANADIUM		12.3			12.4			8.84		
ZINC		51.5	J	CD	41.1	J	CD	25.3	J	CD

EPA-NE - Data Validation Worksheet
INORG-XI

XI. ICP SERIAL DILUTIONS

Use a separate worksheet for each serial dilution sample.

Sample No.: SB102-0204 Matrix: _____ Method: _____

List all serial dilution analytes that are outside method QC acceptance criteria.

% Difference method QC acceptance criteria: 10 ✓

Minimum concentration required to apply the % D criteria (e.g., 50x MDL): 50x MDL

Analyte	^{ug/L} non-prep MDL	Min. Conc. Required	Sample Result SR	Serial Dilution Sample Result (corrected for dilution)	% D	Action
Be	1	50	3.66	ND	100	SR < 50 MDL, no action
Mn	3	150	6355.2	7147	12.5	Tail (biased low)
K	1000	50000	2393.7	ND	100	SR < 50 MDL, no action
	prep MDL	Concentrated by 4				
Be	0.25	12.5	SR < 50 MDL			
Mn	0.75	37.5	Ⓟ			
K	250	12500	SR < 50 MDL			
Comments: Estimate positive results (J) if %D > 15 and dilution result < sample result (biased high) ^{matrix enhancing} Estimate positive and non-detected results (J, NJ) if %D > 15 and dilution result > sample result (biased low) ^{matrix suppressing}						

Validator: _____

Date: _____

DRAFT 11/08



TETRA TECH NUS, INC.

RECORD OF REVIEW

1. TITLE AS IT APPEARS ON THE DOCUMENT – (See instruction #1 on reverse for definition of Documents):

DV Memo to T. Campbell, CTOWE20, On Shore Derecktor Shipyard, Site 19, Naval Station Newport, Newport, Rhode Island

Tier II Organic Data Validation, SDG 1103242 (Air samples)

2. DATE OF DOCUMENT: 5/3/11

DOCUMENT CONTROL No.: C-Nary-05-11-4331-W

AUTHORS: J. Cardinal

TINUS JOB CHARGE No.: 112G02125 – SA.DV

TYPE (DRAFT, DRAFT FINAL, FINAL): Final

SUBMITTAL DATE:

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REVIEWERS ASSIGNED BY:

Date

Assigned Reviewer (See Instruction #3)	Disapproval		Approved with Suggestions		Reviewer Requires Final Verification		Approved By	
	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) Lucy Guzman							AF	5/5/11
b)								
c)								
d)								

4. COMMENTS (Explain conditions and comments, or state where comments and edits are provided. Attach additional pages as needed):

5. AUTHOR COMMENTS/RESOLUTION:

6. APPROVAL FOR TRANSMITTAL:

DATE: _____

See #7 on Reverse for Authority to Approve Transmittals

**TETRA TECH NUS, INC****INTERNAL CORRESPONDENCE**

C-NAVY-05-11-4331W

Date: May 05, 2011

c: File G02125-4.10 (w/enc.-original)

To: T. Campbell (w/o enc.)

From: J. Cardinal (no copy) *JC*

Subject: Tier II Organic Data Validation, SDG 1103242

Air Toxics LTD

CTO WE20, Study Area Screening Evaluation, On-Shore Dereecktor Shipyard, Site 19,
NAVSTA Newport, Newport, Rhode Island

VOC:

5/Air (SUMMA canisters)/

DSY-SG-DUP01-0211

DSY-SG-MW02A-0708

DSY-SG-MW03-0608

DSY-SG-MW11A-0203

DSY-SG-MW12-0506

(Field Duplicate Pair: DSY-SG-MW03-0608/DSY-SG-DUP01-0211)

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compound (VOC) analytical data for the air samples collected at the On-Shore Dereecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI site on February 24 and March 3, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Dereecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to Method TO-15 in both the full scan and selective ion monitoring (SIM) modes. The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs). The data user should consider the most recent revisions to the applicable regulatory limits. The VOC data validation was performed in accordance with the Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- * • Preservation and Technical Holding Times
- * • GC/MS Instrument Performance Check (Tuning)
- * • Initial and Continuing Calibrations
- * • Blanks
- * • Surrogate Compounds
- * • Internal Standards
- * • Laboratory Duplicates
- * • Laboratory Control Sample/Laboratory Control Sample Duplicate
- Field Duplicates

- Limits of Detection
 - * All criteria were met for this parameter.

Laboratory Data Completeness

On April 11, 2011 the laboratory submitted the instrument method detection limits (MDLs) in units of $\mu\text{g}/\text{m}^3$ since the sample results are reported down to the MDLs. The laboratory does not currently have a way to populate the report with MDLs in units of $\mu\text{g}/\text{m}^3$.

On April 21, 2011 the laboratory resubmitted all affected forms to report the non-detected values at the LOD, except the non-standard compounds acrylonitrile and vinyl bromide. The LODs for non-standard compounds are listed as "NA" in the Forms I. Tetra Tech Chemist J. Cardinal used professional judgment to report non-detects for acrylonitrile and vinyl bromide at the reporting limit (LOQ) in the summary data tables.

Field Duplicates

The field duplicate pair DSY-SG-MW03-0608/DSY-SG-DUP01-0211 did not meet the field duplicate QC criteria of RPD <30% for the following compounds:

Analyte	Sample Result ($\mu\text{g}/\text{m}^3$)	Duplicate Result ($\mu\text{g}/\text{m}^3$)	RPD	Action	
				(+)	NDs
Vinyl chloride	0.39	0.15	89	J	
Ethylbenzene	0.25	0.13	63	J	
m+p-Xylenes	0.73	0.15 J	132	J	
o-Xylene	0.58	0.064 J	160	J	
4-Ethyltoluene	1.5	0.68 U	NC	J	UJ
1,2,4-Trimethylbenzene	2.4	0.68 U	NC	J	UJ

J – Result is estimated.

U – Result is not detected.

NC – Not calculated.

In addition, the 4-ethyltoluene and 1,2,4-trimethylbenzene sample results are greater than 2x the reporting limit while the duplicate results are non-detect.

Although vinyl chloride, ethylbenzene, m+p-xylenes, o-xylene, 4-ethyltoluene, and 1,2,4-trimethylbenzene did not meet the field duplicate QC criteria, the project precision goals are not impacted since either there are no project action limits established for these compounds for the air samples or the affected sample results are much lower than the project action limits. The positive and non-detected vinyl chloride, ethylbenzene, m+p-xylenes, o-xylene, 4-ethyltoluene, and 1,2,4-trimethylbenzene results in samples DSY-SG-MW03-0608 and DSY-SG-DUP01-0211 are usable as estimated values for which the bias is indeterminate.

Limits of Detection

Non-detected results were reported at the laboratory's limit of detection (LOD) except for the non-standard compounds acrylonitrile and vinyl bromide for which the non-detected results were reported at the laboratory's limit of quantitation (LOQ, or RL). Positive results below LOQ and above the

laboratory's method detection limit (MDL) were qualified as estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) are evaluated for non-detected values only (reported at the MDL).

All PALs were met by the MDLs except for 1,2-dibromoethane, acrylonitrile, and hexachlorobutadiene. Data usability may be impacted for these compounds.

Analytical Data Usability Assessment

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

The project goals with respect to accuracy were met for the volatiles data set. Data usability is not impacted with regards to accuracy.

The project goals with respect to precision were met for the volatiles data set. Vinyl chloride, ethylbenzene, m+p-xylenes, o-xylene, 4-ethyltoluene, and 1,2,4-trimethylbenzene were qualified as estimated in samples DSY-SG-MW03-0608 and DSY-SG-DUP01-0211 due to poor field duplicate precision. Although the QC criteria were not met in this instance, data usability is not impacted and the affected positive and non-detected results are usable as estimated values.

The project goals with respect to sensitivity were met for the volatiles data set with the following exception. All PALs were met by the MDLs except for 1,2-dibromoethane, acrylonitrile, and hexachlorobutadiene. Data usability may be impacted for these compounds.

The project goals with respect to laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to laboratory data completeness.

Tables: Data Summary Tables
 Data Validation Qualifiers and Codes

Enclosures: Data Validation Worksheets

Data Validation Qualifiers and Codes

Data Validation Qualifiers:

- = No qualifier attached to value (positive hit)
- J = Value is estimated
- U = Value is not detected
- UJ = Value is not detected and estimated
- R = Value (positive hit) is not usable
- UR = Value was reported as ND but is not usable

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- O = Poor Instrument Performance (e.g. base-line drifting)
- P = Uncertainty below quantitation limit ($< QL$ but $\geq MDL$)
- Q = Other problems (can encompass a number of issues; e.g. chromatography, interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = % Difference between columns/detectors $>25\%$ for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids $<30\%$
- Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125 SDG: 1103242 FRACTION: OV MEDIA: AIR	NSAMPLE	DSY-SG-DUP01-0211			DSY-SG-MW02A-0708			DSY-SG-MW03-0608			DSY-SG-MW11A-0203		
	LAB_ID	1103242R1-01A			1103242R1-02A			1103242R1-03A			1103242R1-04A		
	SAMP_DATE	2/24/2011			2/24/2011			2/24/2011			3/3/2011		
	QC_TYPE	FD			NM			NM			NM		
	UNITS	UG/M3			UG/M3			UG/M3			UG/M3		
	PCT_SOLIDS												
	DUP_OF	DSY-SG-MW03-0608											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		0.26			0.1	J	P	0.26			0.11	J	P
1,1,2,2-TETRACHLOROETHANE		0.028	U		0.027	U		0.028	U		0.031	U	
1,1,2-TRICHLOROETHANE		0.028	U		0.027	U		0.028	U		0.031	U	
1,1,2-TRICHLOROTRIFLUOROETHANE		0.53	J	P	0.79	J	P	0.5	J	P	0.6	J	P
1,1-DICHLOROETHANE		0.076	J	P	0.25			0.16			0.11	J	P
1,1-DICHLOROETHENE		0.014	U		0.013	U		0.014	U		0.016	U	
1,2,4-TRICHLOROBENZENE		2	U		2	U		2	U		2.3	U	
1,2,4-TRIMETHYLBENZENE		0.35	UJ	G	0.38	J	P	2.4	J	G	0.58	J	P
1,2-DIBROMOETHANE		0.53	U		0.51	U		0.53	U		0.59	U	
1,2-DICHLOROBENZENE		0.42	U		0.4	U		0.42	U		0.46	U	
1,2-DICHLOROETHANE		0.014	U		0.013	U		0.014	U		0.016	U	
1,2-DICHLOROPROPANE		0.32	U		0.31	U		0.32	U		0.36	U	
1,2-DICHLOROTETRAFLUOROETHANE		0.49	U		0.47	U		0.49	U		0.54	U	
1,3,5-TRIMETHYLBENZENE		0.35	U		0.34	U		1.1			0.39	U	
1,3-BUTADIENE		2.3			3.1			2.3			13		
1,3-DICHLOROBENZENE		0.42	U		0.4	U		0.42	U		0.46	U	
1,4-DICHLOROBENZENE		0.42	U		0.4	U		0.42	U		0.46	U	
1-ETHYL-4-METHYL BENZENE		0.35	UJ	G	0.36	J	P	1.5	J	G	0.47	J	P
2-BUTANONE		5.2			3.3			6.1			17		
2-HEXANONE		1.1	U		0.28	J	P	1.1	U		0.83	J	P
3-CHLOROPROPENE		0.88	U		2.1	U		0.88	U		0.98	U	
4-METHYL-2-PENTANONE		0.21	J	P	0.87			0.26	J	P	0.84		
ACRYLONITRILE		1.5	U		1.4	U		1.5	U		2.8		
BENZENE		0.67			5.2			0.71			6.8		
BENZYL CHLORIDE		0.36	U		0.35	U		0.36	U		0.4	U	
BROMODICHLOROMETHANE		0.47	U		0.46	U		0.47	U		0.53	U	
BROMOETHENE		3	U		2.9	U		3	U		3.4	U	
BROMOFORM		0.72	U		0.7	U		0.72	U		0.81	U	
BROMOMETHANE		0.49	U		0.47	U		0.49	U		0.54	U	
CARBON TETRACHLORIDE		0.43	U		0.42	U		0.43	U		0.48	U	
CHLOROBENZENE		0.32	U		0.31	U		0.32	U		0.3	J	P
CHLORODIBROMOMETHANE		0.6	U		0.58	U		0.6	U		0.67	U	
CHLOROETHANE		0.18	U		0.17	U		0.18	U		1.3	J	P
CHLOROFORM		0.15	J	P	0.18	J	P	0.14	J	P	0.7	J	P
CHLOROMETHANE		0.14	U		0.13	U		0.14	U		4.9		

PROJ_NO: 02125 SDG: 1103242 FRACTION: OV MEDIA: AIR	NSAMPLE	DSY-SG-MW12-0506		
	LAB_ID	1103242R1-05A		
	SAMP_DATE	3/3/2011		
	QC_TYPE	NM		
	UNITS	UG/M3		
	PCT_SOLIDS			
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		0.055	J	P
1,1,2,2-TETRACHLOROETHANE		0.034	U	
1,1,2-TRICHLOROETHANE		0.034	U	
1,1,2-TRICHLOROTRIFLUOROETHANE		0.57	J	P
1,1-DICHLOROETHANE		0.086	J	P
1,1-DICHLOROETHENE		0.017	U	
1,2,4-TRICHLOROBENZENE		2.5	U	
1,2,4-TRIMETHYLBENZENE		1		
1,2-DIBROMOETHANE		0.64	U	
1,2-DICHLOROBENZENE		0.5	U	
1,2-DICHLOROETHANE		0.017	U	
1,2-DICHLOROPROPANE		0.39	U	
1,2-DICHLOROTETRAFLUOROETHANE		0.59	U	
1,3,5-TRIMETHYLBENZENE		0.3	J	P
1,3-BUTADIENE		6.4		
1,3-DICHLOROBENZENE		0.5	U	
1,4-DICHLOROBENZENE		0.5	U	
1-ETHYL-4-METHYL BENZENE		1		
2-BUTANONE		11		
2-HEXANONE		1	J	P
3-CHLOROPROPENE		1	U	
4-METHYL-2-PENTANONE		0.97		
ACRYLONITRILE		1.8	U	
BENZENE		4.8		
BENZYL CHLORIDE		0.44	U	
BROMODICHLOROMETHANE		0.57	U	
BROMOETHENE		3.7	U	
BROMOFORM		0.87	U	
BROMOMETHANE		0.59	U	
CARBON TETRACHLORIDE		0.52	U	
CHLOROBENZENE		0.17	J	P
CHLORODIBROMOMETHANE		0.72	U	
CHLOROETHANE		0.6	J	P
CHLOROFORM		0.27	J	P
CHLOROMETHANE		1.3		

PROJ_NO: 02125 SDG: 1103242 FRACTION: OV MEDIA: AIR	NSAMPLE	DSY-SG-DUP01-0211			DSY-SG-MW02A-0708			DSY-SG-MW03-0608			DSY-SG-MW11A-0203		
	LAB_ID	1103242R1-01A			1103242R1-02A			1103242R1-03A			1103242R1-04A		
	SAMP_DATE	2/24/2011			2/24/2011			2/24/2011			3/3/2011		
	QC_TYPE	FD			NM			NM			NM		
	UNITS	UG/M3			UG/M3			UG/M3			UG/M3		
	PCT_SOLIDS												
	DUP_OF	DSY-SG-MW03-0608											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CIS-1,2-DICHLOROETHENE		0.014	U		0.14			0.062	J	P	27		
CIS-1,3-DICHLOROPROPENE		0.32	U		0.31	U		0.32	U		0.36	U	
CYCLOHEXANE		0.24	U		1.8			0.24	U		0.3	J	P
DICHLORODIFLUOROMETHANE		3			2.2			3			2.4		
ETHYLBENZENE		0.13	J	G	1.1			0.25	J	G	0.57		
HEXACHLOROBUTADIENE		3	U		2.8	U		3	U		3.3	U	
HEXANE		1.7			4.8			2.1			3.4		
M+P-XYLENES		0.15	J	GP	0.87			0.73	J	G	0.81		
METHYL TERT-BUTYL ETHER		0.014	U		0.0085	J	P	0.014	U		0.016	U	
METHYLENE CHLORIDE		0.65	J	P	0.23	U		1.5			0.8	J	P
N-HEPTANE		0.6			1.8			0.47	J	P	1.6		
O-XYLENE		0.064	J	GP	0.34			0.58	J	G	0.41		
STYRENE		0.29	U		0.28	U		0.29	U		0.69		
TETRACHLOROETHENE		1.1			4.7			1			12		
TETRAHYDROFURAN		0.82	U		0.79	U		0.82	U		0.91	U	
TOLUENE		0.67			7.2			0.8			2.6		
TRANS-1,2-DICHLOROETHENE		0.014	U		0.013	U		0.014	U		4.1		
TRANS-1,3-DICHLOROPROPENE		0.32	U		0.31	U		0.32	U		0.36	U	
TRICHLOROETHENE		7.8			0.088	J	P	7.7			120		
TRICHLOROFLUOROMETHANE		1.8			1.9			1.8			1.8		
VINYL CHLORIDE		0.15	J	G	0.76			0.39	J	G	0.49		

PROJ_NO: 02125 SDG: 1103242 FRACTION: OV MEDIA: AIR	NSAMPLE	DSY-SG-MW12-0506		
	LAB_ID	1103242R1-05A		
	SAMP_DATE	3/3/2011		
	QC_TYPE	NM		
	UNITS	UG/M3		
	PCT_SOLIDS			
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
CIS-1,2-DICHLOROETHENE		0.017	U	
CIS-1,3-DICHLOROPROPENE		0.39	U	
CYCLOHEXANE		0.44	J	P
DICHLORODIFLUOROMETHANE		2		
ETHYLBENZENE		0.92		
HEXACHLOROBUTADIENE		3.6	U	
HEXANE		3		
M+P-XYLENES		1.7		
METHYL TERT-BUTYL ETHER		0.015	J	P
METHYLENE CHLORIDE		1	J	P
N-HEPTANE		2.7		
O-XYLENE		0.8		
STYRENE		0.43	J	P
TETRACHLOROETHENE		1.5		
TETRAHYDROFURAN		0.99	U	
TOLUENE		3.5		
TRANS-1,2-DICHLOROETHENE		0.017	U	
TRANS-1,3-DICHLOROPROPENE		0.39	U	
TRICHLOROETHENE		1.3		
TRICHLOROFLUOROMETHANE		7.4		
VINYL CHLORIDE		0.32		



TETRA TECH NUS, INC.

RECORD OF REVIEW

1. TITLE AS IT APPEARS ON THE DOCUMENT -- (See instruction #1 on reverse for definition of Documents):

DV Memo to T. Campbell, CTOWE20, ON SHORE DERECKTOR SHIPYARD, SITE 19, NAVAL STATION
NEWPORT, NEWPORT, RHODE ISLAND

Tier II Organic Data Validation, SDG CTOWE20_002

2. DATE OF DOCUMENT: 4/8/11 4/19/11

DOCUMENT CONTROL No.: C-Nary-04-11-42924

AUTHORS: J. Cardinal

TINUS JOB CHARGE No.: 112G02125 - SA.DV

TYPE (DRAFT, DRAFT FINAL, FINAL): Final

SUBMITTAL DATE:

3. REVIEWER AND STATUS

REVIEWERS ASSIGNED BY:

Date

Assigned Reviewer (See Instruction #3)	Disapproval		Approved with Suggestions		Reviewer Requires Final Verification		Approved By	
	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) Lucy Guzman							JP	4/18/11
b)					E		JP	4/19/11
c)								
d)								

4. COMMENTS (Explain conditions and comments, or state where comments and edits are provided. Attach additional pages as needed):

5. AUTHOR COMMENTS/RESOLUTION:

6. APPROVAL FOR TRANSMITTAL:

DATE: _____

See #7 on Reverse for Authority to Approve Transmittals

**TETRA TECH NUS, INC****INTERNAL CORRESPONDENCE**

C-NAVY-04-11-4292W

Date: April 19, 2011

c: File G02125-4.10 (w/enc.-original)

To: T. Campbell (w/o enc.)

From: J. Cardinal (no copy) *JP (b)*

Subject: Tier II Organic Data Validation, SDG CTOWE20_002
Empirical Laboratories, LLC
CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,
NAVSTA Newport, Newport, Rhode Island

VOC:

2/Groundwaters/ DSY-GW-MW02A-022411 DSY-GW-MW03-022411

1/Trip Blank/ DSY-GW-TB01-022411

PAH/PCB/GRO/DRO:

8/Soils/	DSY-SO-DUP02-0211	DSY-SO-SB208-000.5
	DSY-SO-SB209-0.30.7	DSY-SO-SB210-0102
	DSY-SO-SB211-0102	DSY-SO-SB212-0204
	DSY-SO-SB213-0203	DSY-SO-SB214-0203

(Field Duplicate Pair: DSY-SO-SB208-000.5/DSY-SO-DUP02-0211)

GRO:

1/Trip Blank/ DSY-SO-TB02-022511

PCB:

5/Soils/	DSY-SO-DUP01-022211	DSY-SO-SB215-000.5
	DSY-SO-SB216-000.5	DSY-SO-SB217-000.5
	DSY-SO-SB224-000.5	

(Field Duplicate Pair: DSY-SO-SB224-000.5/DSY-SO-DUP01-022211)

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), diesel range organic (DRO; C8-C40), and gasoline range organic (GRO; C6-C10) analytical data for the samples in this SDG. The samples were collected at the On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI from February 22 – 25, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to USEPA SW-846 Method 8260B. The PAH analysis was performed according to USEPA SW-846 Method 8270C. The PCB analysis was performed according to USEPA SW-846 Method 8082A. The DRO and GRO analyses were performed according to USEPA SW-846 Method 8015B.

The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs) listed in Table A-2. The data user should consider the most recent revisions to the applicable regulatory limits. The VOC, PAH, GRO, and DRO data validation was performed in accordance with the Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996. The PCB data validation was performed according to the Region I, EPA-NE Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, Part III, February 2004.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- * • Preservation and Technical Holding Times
- * • GC/MS Instrument Performance Check (Tuning)
- Initial and Continuing Calibrations
- * • Blanks
- Surrogate Compounds
- * • Internal Standards
- Matrix Spike/Matrix Spike Duplicate
- * • Laboratory Control Sample/Laboratory Control Sample Duplicate
- Field Duplicates
- Analyte Identification/Quantitation
- * • Percent Solids
- Limits of Detection

* All criteria were met for this parameter.

Laboratory Data Completeness

Volatiles

On April 6, 2011 the laboratory resubmitted the preparation bench sheets for the volatile samples to show that the pH of the samples was ≤ 2 since this was not provided in the original data package.

PCB

On April 6, 2011 the laboratory resubmitted the case narrative to note that sample DSY-SO-SB214-0203 surrogates were outside limits on both columns. The laboratory suspected matrix interferences for this sample. On April 6, 2011 the laboratory further clarified in an email that the non-compliance was evaluated the day after the holding time expired. Since the sample was outside holding time and the recovery was not rejectable ($>10\%$), no further action was taken by the laboratory. On April 11, 2011 Tetra Tech Chemist, J. Cardinal, instructed the laboratory that, in the future, samples with recoveries outside the QC limits on both columns need to be re-extracted and re-analyzed. In addition, the Tetra Tech Statement of Work listed the PCB holding time as "none" for this project. No further action was taken.

On April 11, 2011 the laboratory clarified that all TCMX results were removed from the PCB section of the data package in the resubmitted package since TCMX is not applicable to the PCB analysis. On April 12, 2011 the laboratory submitted all revised forms.

On April 6, 2011 the laboratory resubmitted select PCB initial calibration pages since the original pages did not have the correct analysis date and the data set was not complete. On April 12, 2011 the laboratory resubmitted the affected forms to correct the page numbers since the page numbers were not correct in the resubmittal.

PAH

On April 18, 2011 the laboratory informed Tetra Tech that a calibration error for low-level PAHs affected the soil samples in this SDG. The reported LOQs were not supported by the low standard of the calibration curve. On April 19, 2011 the laboratory resubmitted the Analysis Data Sheets (Form 1s) for all PAH samples in this SDG to show the correct LOQs. The data summary tables were edited to include additional "J" values due to a higher LOQ. The edited data summary tables have been added to the data validation memorandum.

Initial and Continuing Calibrations

Volatiles

The following table summarizes the volatile compounds that failed to meet the continuing calibration (CC) criterion of %D <20 for CCCs and %D <25 for all other compounds:

Compound	%D	Action		Affected Samples
		(+)	NDs	
Acetone	34.1		UJ	All samples
Bromodichloromethane	28.6		UJ	
Carbon tetrachloride	36.3		UJ	
1,2-Dichloroethane	39.1		UJ	
1,1,1-Trichloroethane	32.0		UJ	
Trichlorotrifluoromethane	27.2		UJ	

Although the %D was outside of the QC limit for acetone, bromodichloromethane, carbon tetrachloride, 1,2-dichloroethane, 1,1,1-trichloroethane, and trichlorotrifluoromethane; the project accuracy goals are not impacted since the affected sample results are more than an order of magnitude below the PAL or there are no regulatory limits established for the compounds. Also, there are no regulatory limits established for the trip blank sample. The non-detected acetone, bromodichloromethane, carbon tetrachloride, 1,2-dichloroethane, 1,1,1-trichloroethane, and trichlorotrifluoromethane results in the affected samples are usable as estimated values.

GRO

The following table summarizes the hydrocarbon range that failed to meet the continuing calibration (CC) criterion of %D <20:

Hydrocarbon Range	%D	Action		Affected Sample
		(+)	NDs	
GRO	-71.7		UJ	DSY-SO-SB214-0203RE

Although the %D was outside of the QC limit for GRO, the project accuracy goals are not impacted since the affected sample result is more than an order of magnitude below the PAL. The non-detected GRO result in the affected sample is usable as an estimated value.

PCB

The following table summarizes the Aroclor that failed to meet the continuing calibration (CC) criterion of %D <20:

Aroclor	Col. 1 %D	Col. 2 %D	Action		Affected Samples
			(+)	NDs	
Aroclor-1016	21.44, 21.04, 27.14	-26.82, -26.68, -28.42		UJ	All samples except DSY-SO-SB213-0203, DSY-SO-SB214-0203

Although the %D was outside of the QC limit for Aroclor-1016, the project accuracy goals are not impacted since the affected sample results are more than an order of magnitude below the PAL. The non-detected Aroclor-1016 results in the affected samples are usable as estimated values.

Surrogate Compounds

PCB

The following sample had surrogate spike recoveries outside of the recovery limits:

Sample	DCB %Rec. (QC Limits: 60-125)		Action	
	Column 1	Column 2	(+)	NDs
DSY-SO-SB214-0203	37.2	36.5		UJ

Although the surrogate recovery QC criteria were not met for decachlorobiphenyl (DCB) in the affected sample, the project accuracy goals are not impacted since the sample results are more than an order of magnitude below the PALs. The non-detected PCB Aroclor results in sample DSY-SO-SB214-0203 are usable as estimated values which may be biased low.

Matrix Spike/Matrix Spike Duplicate

PAH

The following table summarizes the results of the matrix spike and/or matrix spike duplicate (MS/MSD) analysis of sample DSY-SO-SB208-000.5 that were outside of the QC limit:

Compound	MS/MSD %Rec.	%Rec. QC Limits	RPD	RPD QC Limit	Action	
					(+)	NDs
Benzo(a)anthracene	-20.3/-23.6	31-146	-	-	J	
Benzo(a)pyrene	-9.25/-7.96	28-128	-	-	J	
Benzo(b)fluoranthene	-52.1/-42.8	30-139	-	-	J	
Chrysene	-34.4/-41.9	39-134	-	-	J	
Phenanthrene	-97.5/-127	32-127	-	-	J	
Pyrene	-78.7/-89.7	28-130	-	-	J	
Benzo(g,h,i)perylene	-/14.2	21-149	-	-	J	
2-Methylnaphthalene	-	-	38.0	30	J	
Naphthalene	-	-	41.6	30	J	

-Criterion met

The MS/MSD recoveries for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene did not meet the QC limit; therefore, the project accuracy goals may be impacted. The positive benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene results in sample DSY-SO-SB208-000.5 are usable as estimated values which may be biased low.

Although the MS/MSD recoveries for phenanthrene, pyrene, and benzo(g,h,i)perylene did not meet the QC limit; the project accuracy goals are not impacted since the affected sample results are more than an order of magnitude below the PALs. The positive phenanthrene, pyrene, and benzo(g,h,i)perylene results in sample DSY-SO-SB208-000.5 are usable as estimated values which may be biased low.

Although the MS/MSD relative percent differences for 2-methylnaphthalene and naphthalene did not meet the QC limits; the project precision goals are not impacted since the affected sample results are more than an order of magnitude below the PALs. The positive 2-methylnaphthalene and naphthalene results in sample DSY-SO-SB208-000.5 are usable as estimated values for which the bias is indeterminate.

Field Duplicates

PAH

The field duplicate pair DSY-SO-SB208-000.5/DSY-SO-DUP02-0211 exceeded the relative percent difference QC criterion of 50% for the following compounds:

Analyte	Sample Result (µg/kg)	Duplicate Result (µg/kg)	RPD	Action	
				(+)	NDs
Anthracene	45.1	3.94 U	NC	J	UJ
Acenaphthene	36.7	10.0	114	J	
Benzo(a)anthracene	149	51.5	97	J	
Benzo(a)pyrene	129	46.3	94	J	
Benzo(b)fluoranthene	194	67.4	63	J	
Benzo(g,h,i)perylene	59.5	28.4	71	J	
Benzo(k)fluoranthene	71.2	28.8	85	J	
Chrysene	161	48.1	108	J	
Fluoranthene	3650	103	109	J	
Indeno(1,2,3-cd)pyrene	55.1	23.5	80	J	
2-Methylnaphthalene	33.1	18.8	55	J	

Analyte	Sample Result (µg/kg)	Duplicate Result (µg/kg)	RPD	Action	
				(+)	NDs
Phenanthrene	280	77.9	113	J	
Pyrene	264	79.1	108	J	

J – Result is estimated.

U – Not detected.

NC – Not calculated.

In addition, the sample result for anthracene is greater than 2x the limit of quantitation (LOQ) while the duplicate result is non-detect.

The field duplicate relative percent difference for the compounds listed above exceeded the QC criterion; therefore, the project precision goals may be impacted. The affected positive and non-detected results in samples DSY-SO-SB208-000.5 and DSY-SO-DUP02-0211 are usable as estimated values for which the bias is indeterminate.

Analyte Identification/Quantitation

PCB

The %RPD between the results of analytical columns 1 and 2 exceeded the 40% RPD QC criterion for the compounds in the following samples:

Sample	Analyte	%RPD	Action
			(+)
DSY-SO-DUP02-0211	Aroclor-1260	51	J
DSY-SO-SB208-000.5	Aroclor-1260	56	J
DSY-SO-SB209-0.30.7	Aroclor-1260	62	J

The analyte quantitation relative percent differences exceeded the 40% RPD QC limit for the sample listed above; therefore, the project accuracy goals may be affected due to analytical interferences detected in the dual column analysis. The positive Aroclor-1260 results in the affected samples are usable as estimated values.

Limits of Detection

All non-detected results were reported at the limit of detection (LOD). Positive results above the detection limit (DL) and below the limit of quantitation (LOQ) were qualified as estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

There are no PALs established for the trip blank samples.

Volatiles

All PALs for the groundwater samples were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

PAH/DRO/GRO/PCB

All PALs for PAH, DRO, GRO, and PCBs for the soil samples were met by the LODs.

Analytical Data Usability Assessment

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

Volatiles

The project goals with respect to accuracy were met for the volatiles data set. Acetone, bromodichloromethane, carbon tetrachloride, 1,2-dichloroethane, 1,1,1-trichloroethane, and trichlorotrifluoromethane were qualified as estimated in all samples due to poor instrument calibration variability. Although specific method criteria were not met in this instance, data usability is not impacted and the affected non-detected results are usable as estimated values.

The project goals with respect to sensitivity were met for the volatiles data set with the following exception. All PALs for the groundwater samples were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

The project goals with respect to precision and laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to precision and laboratory data completeness.

PAH

The project goals with respect to accuracy were met for the PAH data set with the following exception. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were qualified as estimated in sample DSY-SO-SB208-000.5 due to low MS/MSD recoveries; the affected results may be biased low. Although specific method criteria were not met in this instance, the affected positive results are usable as estimated values which may have a minor impact on data usability. In addition, phenanthrene, pyrene, and benzo(g,h,i)perylene were qualified as estimated in sample DSY-SO-SB208-000.5 due to low MS/MSD recoveries. Although specific method criteria were not met in this instance, data usability is not impacted and the affected positive results are usable as estimated values.

The project goals with respect to precision were met for the PAH data set with the following exception. Several compounds were qualified as estimated in samples DSY-SO-SB208-000.5 and DSY-SO-DUP02-0211 due to poor field duplicate precision. Although specific QC criteria were not met in this instance, the affected positive and non-detected results are usable as estimated values which may have a minor impact on data usability. In addition, 2-methylnaphthalene and naphthalene were qualified as estimated in sample DSY-SO-SB208-000.5 due to poor MS/MSD precision. Although specific method

criteria were not met in this instance, data usability is not impacted and the affected positive results are usable as estimated values.

The project goals with respect to sensitivity and laboratory data completeness were met for the PAH data set. Data usability is not impacted with regards to sensitivity and laboratory data completeness.

PCB

The project goals with respect to accuracy were met for the PCB data set with the following exception. Aroclor-1260 was qualified as estimated in select samples due to analytical interferences detected in the dual column analysis. Although specific method criteria were not met in this instance, the affected positive results are usable as estimated values which may have a minor impact on data usability. In addition, Aroclor-1016 was qualified as estimated in select samples due to poor instrument calibration variability. Sample DSY-SO-SB214-0203 was qualified as estimated due to low surrogate recoveries.. Although specific method criteria were not met in these instances, data usability is not impacted and the affected positive and non-detected results are usable as estimated values.

The project goals with respect to precision, sensitivity, and laboratory data completeness were met for the PCB data set. Data usability is not impacted with regards to precision, sensitivity, and laboratory data completeness.

GRO

The project goals with respect to accuracy were met for the GRO data set. GRO was qualified as estimated in sample DSY-SO-SB214-0203RE due to poor instrument calibration variability. Although specific method criteria were not met in this instance, data usability is not impacted and the affected non-detected results are usable as estimated values.

The project goals with respect to precision, sensitivity, and laboratory data completeness were met for the GRO data set. Data usability is not impacted with regards to precision, sensitivity, and laboratory data completeness.

DRO

The project goals with respect to accuracy, precision, sensitivity, and laboratory data completeness were met for the DRO data set. Data usability is not impacted with regards to accuracy, precision, sensitivity, and laboratory data completeness.

Tables: Data Summary Tables
 Data Validation Qualifiers and Codes

Enclosures: Data Validation Worksheets

Data Validation Qualifiers and Codes

Data Validation Qualifiers:

- = No qualifier attached to value (positive hit)
- J = Value is estimated
- U = Value is not detected
- UJ = Value is not detected and estimated
- R = Value (positive hit) is not usable
- UR = Value was reported as ND but is not usable

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- O = Poor Instrument Performance (e.g. base-line drifting)
- P = Uncertainty below quantitation limit ($< QL$ but $\geq MDL$)
- Q = Other problems (can encompass a number of issues; e.g. chromatography, interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = % Difference between columns/detectors $>25\%$ for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids $<30\%$
- Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125 SDG: CTOWE20_002 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-MW02A-022411			DSY-GW-MW03-022411			DSY-GW-TB01-022411		
	LAB_ID	1102285-01			1102285-02			1102285-03		
	SAMP_DATE	2/24/2011			2/24/2011			2/24/2011		
	QC_TYPE	NM			NM			TB		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS									
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
1,1,2,2-TETRACHLOROETHANE		0.5	U		0.5	U		0.5	U	
1,1,2-TRICHLOROETHANE		0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHANE		0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHENE		0.5	U		0.5	U		0.5	U	
1,2,4-TRICHLOROBENZENE		0.5	U		0.5	U		0.5	U	
1,2-DIBROMO-3-CHLOROPROPANE		1	U		1	U		1	U	
1,2-DIBROMOETHANE		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROETHANE		0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
1,2-DICHLOROPROPANE		0.5	U		0.5	U		0.5	U	
1,3-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U	
1,4-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U	
2-BUTANONE		5	U		5	U		5	U	
2-HEXANONE		2.5	U		2.5	U		2.5	U	
4-METHYL-2-PENTANONE		2.5	U		2.5	U		2.5	U	
ACETONE		5	UJ	C	5	UJ	C	5	UJ	C
BENZENE		0.5	U		0.5	U		0.5	U	
BROMODICHLOROMETHANE		0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
BROMOFORM		0.5	U		0.5	U		0.5	U	
BROMOMETHANE		1	U		1	U		1	U	
CARBON DISULFIDE		0.5	U		0.5	U		0.5	U	
CARBON TETRACHLORIDE		0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
CHLOROBENZENE		0.5	U		0.5	U		0.5	U	
CHLORODIBROMOMETHANE		0.5	U		0.5	U		0.5	U	
CHLOROETHANE		1	U		1	U		1	U	
CHLOROFORM		0.5	U		0.5	U		0.5	U	
CHLOROMETHANE		0.5	U		0.5	U		0.5	U	
CIS-1,2-DICHLOROETHENE		0.291	J	P	0.5	U		0.5	U	
CIS-1,3-DICHLOROPROPENE		0.5	U		0.5	U		0.5	U	
CYCLOHEXANE		0.5	U		0.5	U		0.5	U	
DICHLORODIFLUOROMETHANE		1	U		1	U		1	U	
ETHYLBENZENE		0.5	U		0.5	U		0.5	U	
ISOPROPYLBENZENE		0.5	U		0.5	U		0.5	U	
M+P-XYLENES		1	U		1	U		1	U	

PROJ_NO: 02125 SDG: CTOWE20_002 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-MW02A-022411			DSY-GW-MW03-022411			DSY-GW-TB01-022411		
	LAB_ID	1102285-01			1102285-02			1102285-03		
	SAMP_DATE	2/24/2011			2/24/2011			2/24/2011		
	QC_TYPE	NM			NM			TB		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS									
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		1	U		1	U		1	U	
METHYL CYCLOHEXANE		0.5	U		0.5	U		0.5	U	
METHYL TERT-BUTYL ETHER		0.5	U		0.5	U		0.5	U	
METHYLENE CHLORIDE		1	U		1	U		1	U	
O-XYLENE		0.5	U		0.5	U		0.5	U	
STYRENE		0.5	U		0.5	U		0.5	U	
TETRACHLOROETHENE		0.5	U		0.696	J	P	0.5	U	
TOLUENE		0.5	U		0.5	U		0.5	U	
TOTAL XYLENES		1.5	U		1.5	U		1.5	U	
TRANS-1,2-DICHLOROETHENE		0.5	U		0.5	U		0.5	U	
TRANS-1,3-DICHLOROPROPENE		0.5	U		0.5	U		0.5	U	
TRICHLOROETHENE		0.5	U		7.35			0.5	U	
TRICHLOROFLUOROMETHANE		1	UJ	C	1	UJ	C	1	UJ	C
VINYL CHLORIDE		0.5	U		0.5	U		0.5	U	

PROJ_NO: 02125 SDG: CTOWE20_002 FRACTION: PAH MEDIA: SOIL	NSAMPLE	DSY-SO-DUP02-0211			DSY-SO-SB208-000.5			DSY-SO-SB209-0.30.7			DSY-SO-SB210-0102		
	LAB_ID	1102288-06			1102288-07			1102288-08			1102288-09		
	SAMP_DATE	2/25/2011			2/25/2011			2/25/2011			2/25/2011		
	QC_TYPE	FD			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	83.5			83.3			87.0			85.7		
	DUP_OF	DSY-SO-SB208-000.5											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		18.8	J	G	33.1	J	DG	299			3.83	U	
ACENAPHTHENE		10	J	GP	36.7	J	G	1000			3.83	U	
ACENAPHTHYLENE		3.94	U		3.97	U		695			5.21	J	P
ANTHRACENE		3.94	UJ	G	45.1	J	G	2290			5.83	J	P
BENZO(A)ANTHRACENE		51.5	J	G	149	J	DG	5740			41.3		
BENZO(A)PYRENE		46.3	J	G	129	J	DG	4920			26.3		
BENZO(B)FLUORANTHENE		67.4	J	G	194	J	DG	7120			38.8		
BENZO(G,H,I)PERYLENE		28.4	J	G	59.5	J	DG	2070			15.7		
BENZO(K)FLUORANTHENE		28.8	J	G	71.2	J	G	2480			16.1		
CHRYSENE		48.1	J	G	161	J	DG	5650			28.6		
DIBENZO(A,H)ANTHRACENE		10.1	J	P	24.7			820			3.83	U	
FLUORANTHENE		103	J	G	350	J	G	13400			61.2		
FLUORENE		6.3	J	P	29.5			1220			2.22	J	P
INDENO(1,2,3-CD)PYRENE		23.5	J	G	55.1	J	G	2070			12.3	J	P
NAPHTHALENE		14.7	J	P	24.5	J	D	751			2.5	J	P
PHENANTHRENE		77.9	J	G	280	J	DG	9530			24.8		
PYRENE		79.1	J	G	264	J	DG	10100			50.1		

PROJ_NO: 02125 SDG: CTOWE20_002 FRACTION: PAH MEDIA: SOIL	NSAMPLE	DSY-SO-SB211-0102			DSY-SO-SB212-0204			DSY-SO-SB213-0203			DSY-SO-SB214-0203		
	LAB_ID	1102288-10			1102288-11			1102288-12			1102288-13		
	SAMP_DATE	2/25/2011			2/25/2011			2/25/2011			2/25/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	80.5			94.3			84.8			59.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		8.89	J	P	3.38	J	P	3.9	U		281		
ACENAPHTHENE		4.11	U		3.53	U		2.87	J	P	5.63	U	
ACENAPHTHYLENE		3.5	J	P	14.2			3.9	U		47.2		
ANTHRACENE		4.11	U		17.2			4.71	J	P	5.63	U	
BENZO(A)ANTHRACENE		38.1			60.5			32.5			252		
BENZO(A)PYRENE		29.9			38.3			18.9			172		
BENZO(B)FLUORANTHENE		44.4			57.9			26.6			336		
BENZO(G,H,I)PERYLENE		21			20			10.7	J	P	91.1		
BENZO(K)FLUORANTHENE		17.5			25.6			11.3	J	P	124		
CHRYSENE		30.4			44.7			20.5			356		
DIBENZO(A,H)ANTHRACENE		7.48	J	P	7.89	J	P	3.9	U		43.7		
FLUORANTHENE		39.6			128			43.2			451		
FLUORENE		4.11	U		8.85	J	P	2.67	J	P	5.63	U	
INDENO(1,2,3-CD)PYRENE		18.5			17.4			10.2	J	P	82.7		
NAPHTHALENE		9.04	J	P	5.06	J	P	3.9	U		175		
PHENANTHRENE		25.2			91.3			25.8			400		
PYRENE		35.8			94.2			33.9			375		

PROJ_NO: 02125 SDG: CTOWE20_002 FRACTION: PCB MEDIA: SOIL	NSAMPLE	DSY-SO-DUP01-022211			DSY-SO-DUP02-0211			DSY-SO-SB208-000.5			DSY-SO-SB209-0.30.7		
	LAB_ID	1102288-01			1102288-06			1102288-07			1102288-08		
	SAMP_DATE	2/22/2011			2/25/2011			2/25/2011			2/25/2011		
	QC_TYPE	FD			FD			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	94.2			83.5			83.3			87.0		
	DUP_OF	DSY-SO-SB224-000.5			DSY-SO-SB208-000.5								
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
AROCLOR-1016		17.2	UJ	C	20	UJ	C	19.1	UJ	C	18.9	UJ	C
AROCLOR-1221		17.2	U		20	U		19.1	U		18.9	U	
AROCLOR-1232		17.2	U		20	U		19.1	U		18.9	U	
AROCLOR-1242		17.2	U		20	U		19.1	U		18.9	U	
AROCLOR-1248		17.2	U		20	U		19.1	U		18.9	U	
AROCLOR-1254		17.2	U		20	U		19.1	U		18.9	U	
AROCLOR-1260		17.2	U		24.2	J	PU	24.7	J	PU	416	J	U

PROJ_NO: 02125 SDG: CTOWE20_002 FRACTION: PCB MEDIA: SOIL	NSAMPLE	DSY-SO-SB210-0102			DSY-SO-SB211-0102			DSY-SO-SB212-0204			DSY-SO-SB213-0203		
	LAB_ID	1102288-09			1102288-10			1102288-11			1102288-12		
	SAMP_DATE	2/25/2011			2/25/2011			2/25/2011			2/25/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	85.7			80.5			94.3			84.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
AROCLOR-1016		18.6	UJ	C	20.7	UJ	C	17.2	UJ	C	18.9	U	
AROCLOR-1221		18.6	U		20.7	U		17.2	U		18.9	U	
AROCLOR-1232		18.6	U		20.7	U		17.2	U		18.9	U	
AROCLOR-1242		18.6	U		20.7	U		17.2	U		18.9	U	
AROCLOR-1248		18.6	U		20.7	U		17.2	U		18.9	U	
AROCLOR-1254		18.6	U		20.7	U		17.2	U		18.9	U	
AROCLOR-1260		18.6	U		20.7	U		17.2	U		18.9	U	

PROJ_NO: 02125 SDG: CTOWE20_002 FRACTION: PCB MEDIA: SOIL	NSAMPLE	DSY-SO-SB214-0203			DSY-SO-SB215-000.5			DSY-SO-SB216-000.5			DSY-SO-SB217-000.5		
	LAB_ID	1102288-13			1102288-02			1102288-03			1102288-04		
	SAMP_DATE	2/25/2011			2/22/2011			2/22/2011			2/22/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	59.1			90.8			94.1			91.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
AROCLOR-1016		26.9	UJ	R	18.1	UJ	C	17.7	UJ	C	17.8	UJ	C
AROCLOR-1221		26.9	UJ	R	18.1	U		17.7	U		17.8	U	
AROCLOR-1232		26.9	UJ	R	18.1	U		17.7	U		17.8	U	
AROCLOR-1242		26.9	UJ	R	18.1	U		17.7	U		17.8	U	
AROCLOR-1248		26.9	UJ	R	18.1	U		17.7	U		17.8	U	
AROCLOR-1254		26.9	UJ	R	18.1	U		17.7	U		17.8	U	
AROCLOR-1260		26.9	UJ	R	18.1	U		17.7	U		17.8	U	

PROJ_NO: 02125 SDG: CTOWE20_002 FRACTION: PCB MEDIA: SOIL	NSAMPLE	DSY-SO-SB224-000.5		
	LAB_ID	1102288-05		
	SAMP_DATE	2/22/2011		
	QC_TYPE	NM		
	UNITS	UG/KG		
	PCT_SOLIDS	92.3		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
AROCLOR-1016		17.8	UJ	C
AROCLOR-1221		17.8	U	
AROCLOR-1232		17.8	U	
AROCLOR-1242		17.8	U	
AROCLOR-1248		17.8	U	
AROCLOR-1254		17.8	U	
AROCLOR-1260		17.8	U	

PROJ_NO: 02125 SDG: CTOWE20_002 FRACTION: PET MEDIA: SOIL	NSAMPLE	DSY-SO-DUP02-0211			DSY-SO-SB208-000.5			DSY-SO-SB209-0.30.7			DSY-SO-SB210-0102		
	LAB_ID	1102288-06			1102288-07			1102288-08			1102288-09		
	SAMP_DATE	2/25/2011			2/25/2011			2/25/2011			2/25/2011		
	QC_TYPE	FD			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	83.5			83.3			87.0			85.7		
	DUP_OF	DSY-SO-SB208-000.5											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIESEL RANGE ORGANICS		35.5			44.8			366			37.6		
GASOLINE RANGE ORGANICS		4.82	J	P	2.83	J	P	3.74	U		4.37	U	

PROJ_NO: 02125 SDG: CTOWE20_002 FRACTION: PET MEDIA: SOIL	NSAMPLE	DSY-SO-SB211-0102			DSY-SO-SB212-0204			DSY-SO-SB213-0203			DSY-SO-SB214-0203RE		
	LAB_ID	1102288-10			1102288-11			1102288-12			1102288-13RE1		
	SAMP_DATE	2/25/2011			2/25/2011			2/25/2011			2/25/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	80.5			94.3			84.8			59.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIESEL RANGE ORGANICS		48.2			17.8			25					
GASOLINE RANGE ORGANICS		4.66	U		4.39	U		3.43	U		6.9	UJ	C

PROJ_NO: 02125 SDG: CTOWE20_002 FRACTION: PET MEDIA: SOIL	NSAMPLE	DSY-SO-TB02-022511		
	LAB_ID	1102288-14		
	SAMP_DATE	2/25/2011		
	QC_TYPE	TB		
	UNITS	MG/KG		
	PCT_SOLIDS			
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
DIESEL RANGE ORGANICS				
GASOLINE RANGE ORGANICS		5 U		



TETRA TECH NUS, INC.

RECORD OF REVIEW

1. TITLE AS IT APPEARS ON THE DOCUMENT – (See instruction #1 on reverse for definition of Documents):

DV Memo to T. Campbell, CTOWE20, ON SHORE DERECKTOR SHIPYARD, SITE 19, NAVAL STATION
NEWPORT, NEWPORT, RHODE ISLAND

Tier II Organic Data Validation, SDG CTOWE20_003

2. DATE OF DOCUMENT: 4/18/11

DOCUMENT CONTROL No.: C-Navy-04-11-4293 W

AUTHORS: J. Cardinal

TINUS JOB CHARGE No.: 112G02125 - SA.DV

TYPE (DRAFT, DRAFT FINAL, FINAL): Final

SUBMITTAL DATE:

3. REVIEWER AND STATUS REVIEWERS ASSIGNED BY: Date

Assigned Reviewer (See Instruction #3)	Disapproval		Approved with Suggestions		Reviewer Requires Final Verification		Approved By	
	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) <i>Lucy Guzman</i>							<i>AF</i>	4/18/11
b)								
c)								
d)								

4. COMMENTS (Explain conditions and comments, or state where comments and edits are provided. Attach additional pages as needed):

5. AUTHOR COMMENTS/RESOLUTION:

6. APPROVAL FOR TRANSMITTAL:

See #7 on Reverse for Authority to Approve Transmittals

DATE: _____

**TETRA TECH NUS, INC****INTERNAL CORRESPONDENCE**

C-NAVY-04-11-4293W

Date: April 18, 2011 c: File G02125-4.10 (w/enc.-original)

To: T. Campbell (w/o enc.)

From: J. Cardinal (no copy)

Subject: Tier II Organic Data Validation, SDG CTOWE20_003
Empirical Laboratories, LLC
CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,
NAVSTA Newport, Newport, Rhode Island

VOC:

5/Groundwaters/	DSY-GW-DUP01-0211	DSY-GW-MW11A-022611
	DSY-GW-MW220-030111	DSY-GW-MW221-030211
	DSY-GW-MW222-030211	

(Field Duplicate Pair: DSY-GW-MW11A-022611/DSY-GW-DUP01-0211)

1/Trip Blank/	DSY-GW-TB01-030111
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VOC/PAH:

2/Groundwaters/	DSY-GW-MW08-030111	DSY-GW-MW218-030111
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Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compounds (VOC) and polycyclic aromatic hydrocarbons (PAH) analytical data for the samples in this SDG. The samples were collected at the On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI from February 26 – March 2, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to USEPA SW-846 Method 8260B. The PAH analysis was performed according to USEPA SW-846 Method 8270C.

The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs). The data user should consider the most recent revisions to the applicable regulatory limits. The VOC and PAH data validation was performed in accordance with the Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- * • Preservation and Technical Holding Times
- * • GC/MS Instrument Performance Check (Tuning)

- *
 - Initial and Continuing Calibrations
 - Blanks
- *
 - Surrogate Compounds
- *
 - Internal Standards
 - Matrix Spike/Matrix Spike Duplicate
- *
 - Laboratory Control Sample/Laboratory Control Sample Duplicate
- *
 - Field Duplicates
 - Limits of Detection

* All criteria were met for this parameter.

Laboratory Data Completeness

Sample ID DSY-GW-TB01-030111 has the suffix "-030111", however, the sample date for this sample is February 26, 2011 per the chain-of-custody form. No further action was taken.

Volatiles

On April 12, 2011 the laboratory resubmitted the preparation bench sheets for the volatile samples to show that the pH of the samples was ≤ 2 since this was not provided in the original data package.

Blanks

PAH

The following table summarizes the level of blank contamination detected in the method blank associated with the samples.

Compound	Type of Blank	Maximum Conc. (µg/L)	Action Level (µg/L)	Affected Sample
Benzo(a)anthracene	Method	0.215	1.075	DSY-GW-MW218-030111

Blank action was applied to the affected groundwater sample due to benzo(a)anthracene method blank contamination. The 5x rule applies for this compound. Positive results below the blank action levels were changed to non-detected values (U) at the sample results.

Although benzo(a)anthracene contamination were found in the method blank, the project sensitivity goals are not impacted since there are no PALs established for benzo(a)anthracene for the groundwater samples. The benzo(a)anthracene result in the affected sample is usable as a non-detected value.

Matrix Spike/Matrix Spike Duplicate

Volatiles

The following table summarizes the results of the matrix spike and/or matrix spike duplicate (MS/MSD) analysis of sample DSY-GW-MW08-030111 that were outside of the QC limit:

Analyte	RPD	RPD QC Limit	Action	
			(+)	NDs
Chloroethane	32.7	30		UJ

Although the MS/MSD relative percent difference for chloroethane did not meet the QC limit; the project precision goals are not impacted since the affected sample result is more than an order of magnitude below the PAL. The non-detected chloroethane result in sample DSY-GW-MW08-030111 is usable as an estimated value for which the bias is indeterminate.

Limits of Detection

All non-detected results were reported at the limit of detection (LOD). Positive results above the detection limit (DL) and below the limit of quantitation (LOQ) were qualified as estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

There are no PALs established for the trip blank sample.

Volatiles

All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

PAH

All PALs were met by the LODs.

Benzo(a)anthracene in sample DSY-GW-MW218-030111 was changed to a non-detected value due to blank contamination. As discussed above in the Blanks section, data usability is not impacted.

Analytical Data Usability Assessment

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

Volatiles

The project goals with respect to precision were met for the volatiles data set. Chloroethane was qualified as estimated in sample DSY-GW-MW08-030111 due to poor MS/MSD precision. Although specific method criteria were not met in this instance, data usability is not impacted and the affected non-detected result is usable as an estimated value.

The project goals with respect to sensitivity were met for the volatiles data set with the following exception. All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

The project goals with respect to accuracy and laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to accuracy and laboratory data completeness.

PAH

The project goals with respect to accuracy, precision, sensitivity, and laboratory data completeness were met for the PAH data set. Data usability is not impacted with regards to accuracy, precision, sensitivity, and laboratory data completeness.

Tables: Data Summary Tables
 Data Validation Qualifiers and Codes

Enclosures: Data Validation Worksheets

Data Validation Qualifiers and Codes

Data Validation Qualifiers:

- = No qualifier attached to value (positive hit)
- J = Value is estimated
- U = Value is not detected
- UJ = Value is not detected and estimated
- R = Value (positive hit) is not usable
- UR = Value was reported as ND but is not usable

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- O = Poor Instrument Performance (e.g. base-line drifting)
- P = Uncertainty below quantitation limit ($< QL$ but $\geq MDL$)
- Q = Other problems (can encompass a number of issues; e.g. chromatography, interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = % Difference between columns/detectors $>25\%$ for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids $<30\%$
- Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125 SDG: CTOWE20_003 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-DUP01-0211			DSY-GW-MW08-030111			DSY-GW-MW11A-022611			DSY-GW-MW218-030111		
	LAB_ID	1103052-01			1103052-04			1103052-02			1103052-06		
	SAMP_DATE	2/26/2011			3/1/2011			2/26/2011			3/1/2011		
	QC_TYPE	FD			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF	DSY-GW-MW11A-022611											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2,2-TETRACHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2-TRICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHENE		0.5	U		0.25	J	P	0.5	U		0.5	U	
1,2,4-TRICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DIBROMO-3-CHLOROPROPANE		1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROPROPANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,3-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
1,4-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
2-BUTANONE		5	U		5	U		5	U		5	U	
2-HEXANONE		2.5	U		2.5	U		2.5	U		2.5	U	
4-METHYL-2-PENTANONE		2.5	U		2.5	U		2.5	U		2.5	U	
ACETONE		5	U		5	U		5	U		5	U	
BENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
BROMODICHLOROMETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
BROMOFORM		0.5	U		0.5	U		0.5	U		0.5	U	
BROMOMETHANE		1	U		1	U		1	U		1	U	
CARBON DISULFIDE		0.5	U		0.5	U		0.5	U		0.5	U	
CARBON TETRACHLORIDE		0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
CHLORODIBROMOMETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROETHANE		1	U		1	UJ	D	1	U		1	U	
CHLOROFORM		0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROMETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
CIS-1,2-DICHLOROETHENE		0.361	J	P	12.7			0.284	J	P	0.5	U	
CIS-1,3-DICHLOROPROPENE		0.5	U		0.5	U		0.5	U		0.5	U	
CYCLOHEXANE		0.5	U		0.5	U		0.5	U		0.5	U	
DICHLORODIFLUOROMETHANE		1	U		1	U		1	U		1	U	
ETHYLBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
ISOPROPYLBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
M+P-XYLENES		1	U		1	U		1	U		1	U	

PROJ_NO: 02125 SDG: CTOWE20_003 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-MW220-030111			DSY-GW-MW221-030211			DSY-GW-MW222-030211			DSY-TB01-030111		
	LAB_ID	1103052-08			1103052-09			1103052-10			1103052-03		
	SAMP_DATE	3/1/2011			3/2/2011			3/2/2011			2/26/2011		
	QC_TYPE	NM			NM			NM			TB		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2,2-TETRACHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2-TRICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHENE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2,4-TRICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DIBROMO-3-CHLOROPROPANE		1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROPROPANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,3-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
1,4-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
2-BUTANONE		5	U		5	U		5	U		5	U	
2-HEXANONE		2.5	U		2.5	U		2.5	U		2.5	U	
4-METHYL-2-PENTANONE		2.5	U		2.5	U		2.5	U		2.5	U	
ACETONE		5	U		5	U		5	U		5	U	
BENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
BROMODICHLOROMETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
BROMOFORM		0.5	U		0.5	U		0.5	U		0.5	U	
BROMOMETHANE		1	U		1	U		1	U		1	U	
CARBON DISULFIDE		0.5	U		0.5	U		0.5	U		0.5	U	
CARBON TETRACHLORIDE		0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
CHLORODIBROMOMETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROETHANE		1	U		1	U		1	U		1	U	
CHLOROFORM		0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROMETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
CIS-1,2-DICHLOROETHENE		4.26			1.49			0.5	U		0.5	U	
CIS-1,3-DICHLOROPROPENE		0.5	U		0.5	U		0.5	U		0.5	U	
CYCLOHEXANE		0.5	U		0.5	U		0.5	U		0.5	U	
DICHLORODIFLUOROMETHANE		1	U		1	U		1	U		1	U	
ETHYLBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
ISOPROPYLBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
M+P-XYLENES		1	U		1	U		1	U		1	U	

PROJ_NO: 02125 SDG: CTOWE20_003 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-DUP01-0211			DSY-GW-MW08-030111			DSY-GW-MW11A-022611			DSY-GW-MW218-030111		
	LAB_ID	1103052-01			1103052-04			1103052-02			1103052-06		
	SAMP_DATE	2/26/2011			3/1/2011			2/26/2011			3/1/2011		
	QC_TYPE	FD			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF	DSY-GW-MW11A-022611											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		1	U		1	U		1	U		1	U	
METHYL CYCLOHEXANE		0.5	U		0.5	U		0.5	U		0.5	U	
METHYL TERT-BUTYL ETHER		0.5	U		0.5	U		0.5	U		0.5	U	
METHYLENE CHLORIDE		1	U		1	U		1	U		1	U	
O-XYLENE		0.5	U		0.5	U		0.5	U		0.5	U	
STYRENE		0.5	U		0.5	U		0.5	U		0.5	U	
TETRACHLOROETHENE		0.5	U		0.5	U		0.5	U		0.5	U	
TOLUENE		0.5	U		0.5	U		0.5	U		0.5	U	
TOTAL XYLENES		1.5	U		1.5	U		1.5	U		1.5	U	
TRANS-1,2-DICHLOROETHENE		0.683	J	P	0.5	U		0.669	J	P	0.5	U	
TRANS-1,3-DICHLOROPROPENE		0.5	U		0.5	U		0.5	U		0.5	U	
TRICHLOROETHENE		4.97			3.9			5.15			0.5	U	
TRICHLOROFLUOROMETHANE		1	U		0.581	J	P	1	U		1	U	
VINYL CHLORIDE		0.5	U		0.263	J	P	0.5	U		0.5	U	

PROJ_NO: 02125 SDG: CTOWE20_003 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-MW220-030111			DSY-GW-MW221-030211			DSY-GW-MW222-030211			DSY-TB01-030111		
	LAB_ID	1103052-08			1103052-09			1103052-10			1103052-03		
	SAMP_DATE	3/1/2011			3/2/2011			3/2/2011			2/26/2011		
	QC_TYPE	NM			NM			NM			TB		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		1	U		1	U		1	U		1	U	
METHYL CYCLOHEXANE		0.5	U		0.5	U		0.5	U		0.5	U	
METHYL TERT-BUTYL ETHER		0.5	U		0.5	U		0.5	U		0.5	U	
METHYLENE CHLORIDE		1	U		1	U		1	U		1	U	
O-XYLENE		0.5	U		0.5	U		0.5	U		0.5	U	
STYRENE		0.5	U		0.5	U		0.5	U		0.5	U	
TETRACHLOROETHENE		0.5	U		0.5	U		0.5	U		0.5	U	
TOLUENE		0.5	U		0.5	U		0.5	U		0.5	U	
TOTAL XYLENES		1.5	U		1.5	U		1.5	U		1.5	U	
TRANS-1,2-DICHLOROETHENE		1.1			0.5	U		0.5	U		0.5	U	
TRANS-1,3-DICHLOROPROPENE		0.5	U		0.5	U		0.5	U		0.5	U	
TRICHLOROETHENE		0.5	U		12.2			5.48			0.5	U	
TRICHLOROFLUOROMETHANE		1	U		1	U		1	U		1	U	
VINYL CHLORIDE		1.47			0.5	U		0.5	U		0.5	U	

PROJ_NO: 02125 SDG: CTOWE20_003 FRACTION: PAH MEDIA: WATER	NSAMPLE	DSY-GW-MW08-030111			DSY-GW-MW218-030111		
	LAB_ID	1103052-04			1103052-06		
	SAMP_DATE	3/1/2011			3/1/2011		
	QC_TYPE	NM			NM		
	UNITS	UG/L			UG/L		
	PCT_SOLIDS						
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		0.0926	U		0.0943	U	
ACENAPHTHENE		0.0926	U		0.0943	U	
ACENAPHTHYLENE		0.0926	U		0.0943	U	
ANTHRACENE		0.0926	U		0.0943	U	
BENZO(A)ANTHRACENE		0.0926	U		0.221	U	A
BENZO(A)PYRENE		0.0926	U		0.0943	U	
BENZO(B)FLUORANTHENE		0.0926	U		0.0943	U	
BENZO(G,H,I)PERYLENE		0.0926	U		0.0943	U	
BENZO(K)FLUORANTHENE		0.0926	U		0.0943	U	
CHRYSENE		0.0926	U		0.0943	U	
DIBENZO(A,H)ANTHRACENE		0.0926	U		0.0943	U	
FLUORANTHENE		0.0926	U		0.0943	U	
FLUORENE		0.0926	U		0.0943	U	
INDENO(1,2,3-CD)PYRENE		0.0926	U		0.0943	U	
NAPHTHALENE		0.0926	U		0.0943	U	
PHENANTHRENE		0.0926	U		0.0943	U	
PYRENE		0.0926	U		0.0943	U	



TETRA TECH NUS, INC.

RECORD OF REVIEW

1. TITLE AS IT APPEARS ON THE DOCUMENT – (See instruction #1 on reverse for definition of Documents):

DV Memo to T. Campbell, CTOWE20, ON SHORE DERECKTOR SHIPYARD, SITE 19, NAVAL STATION
NEWPORT, NEWPORT, RHODE ISLAND

Tier II Organic Data Validation, SDG CTOWE20_004

2. DATE OF DOCUMENT: 4/18/11

DOCUMENT CONTROL No.: C-Nary-04-11-4295 W

AUTHORS: J. Cardinal

TINUS JOB CHARGE No.: 112G02125 - SA.DV

TYPE (DRAFT, DRAFT FINAL, FINAL): Final

SUBMITTAL DATE:

3. REVIEWER AND STATUS

REVIEWERS ASSIGNED BY:

Date

Assigned Reviewer (See Instruction #3)	Disapproval		Approved with Suggestions		Reviewer Requires Final Verification		Approved By	
	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) Lucy Guzman							JP	4/19/11
b)								
c)								
d)								

4. COMMENTS (Explain conditions and comments, or state where comments and edits are provided. Attach additional pages as needed):

5. AUTHOR COMMENTS/RESOLUTION:

6. APPROVAL FOR TRANSMITTAL:

See #7 on Reverse for Authority to Approve Transmittals

DATE: _____



TETRA TECH NUS, INC

INTERNAL CORRESPONDENCE

C-NAVY-04-11-4295W

Date: April 18, 2011

c: File G02125-4.10 (w/enc.-original)

To: T. Campbell (w/o enc.)

From: J. Cardinal (no copy)

A handwritten signature in black ink, appearing to be 'J. Cardinal', with a circled 'n' next to it.

Subject: Tier II Organic Data Validation, SDG CTOWE20_004
Empirical Laboratories, LLC
CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,
NAVSTA Newport, Newport, Rhode Island

VOC:

1/Groundwater/ DSY-GW-MW12-030311

VOC/GRO:

1/Trip Blank/ DSY-GW-TB01-030311

VOC/PAH/DRO/GRO/PCB:

1/Rinsate Blank/ DSY-SO-RB01-0311

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), diesel range organic (DRO; C8-C40), and gasoline range organic (GRO; C6-C10) analytical data for the samples in this SDG. The samples were collected at the On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI from March 3-8, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to USEPA SW-846 Method 8260B. The PAH analysis was performed according to USEPA SW-846 Method 8270C. The PCB analysis was performed according to USEPA SW-846 Method 8082A. The DRO and GRO analyses were performed according to USEPA SW-846 Method 8015B.

The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs). The data user should consider the most recent revisions to the applicable regulatory limits. The VOC, PAH, GRO, and DRO data validation was performed in accordance with the Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996. The PCB data validation was performed according to the Region I, EPA-NE Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, Part III, February 2004.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness

- * • Preservation and Technical Holding Times
- * • GC/MS Instrument Performance Check (Tuning)
- Initial and Continuing Calibrations
- * • Blanks
- * • Surrogate Compounds
- * • Internal Standards
- NA • Matrix Spike/Matrix Spike Duplicate
- * • Laboratory Control Sample/Laboratory Control Sample Duplicate
- NA • Field Duplicates
- * • Analyte Identification/Quantitation
- Limits of Detection

* All criteria were met for this parameter.
 NA Not applicable for this SDG.

Laboratory Data Completeness

Although trip blank sample ID DSY-GW-TB01-030311 has the suffix “-030311”, the sample was collected on March 8, 2011 according to the chain-of-custody form. This trip blank is associated with the groundwater sample collected on March 3, 2011. No further action was taken.

On April 6, 2011 the laboratory resubmitted all of the Analysis Data Sheets (Form 1s) for all samples for all fractions in this SDG to correct the sample dates of the samples since the sample dates were incorrect in the original data package.

GRO

On April 18, 2011 the laboratory resubmitted the GRO logbook pages to show that pH was <2 for all GRO samples since the pH of the samples was not included in the original data package.

Initial and Continuing Calibrations

Volatiles

The following table summarizes the volatile compounds that failed to meet the continuing calibration (CC) criterion of %D <25:

Compound	%D	Action		Affected Samples
		(+)	NDs	
Carbon tetrachloride	32.4		UJ	All samples
Cyclohexane	29.5		UJ	
cis-1,3-Dichloropropene	28.2		UJ	
Methylcyclohexane	28.4		UJ	

Although the %D was outside of the QC limit for carbon tetrachloride, cyclohexane, cis-1,3-dichloropropene, and methylcyclohexane; the project accuracy goals are not impacted since the affected groundwater sample results are more than an order of magnitude below the PAL and there are no regulatory limits established for the rinsate and trip blank samples. The non-detected carbon tetrachloride,

cyclohexane, cis-1,3-dichloropropene, and methylcyclohexane results in the affected samples are usable as estimated values.

PAH

The following table summarizes the PAH compounds that failed to meet the continuing calibration (CC) criterion of %D <20:

Compound	%D	Action		Affected Sample
		(+)	NDs	
Benzo(a)anthracene	-25.5		UJ	DSY-SO-RB01-0311

Although the %D was outside of the QC limit for benzo(a)anthracene; the project accuracy goals are not impacted since there are no regulatory limits established for the rinsate blank sample. The non-detected benzo(a)anthracene result in the affected sample is usable as an estimated value.

Limits of Detection

All non-detected results were reported at the limit of detection (LOD). Positive results above the detection limit (DL) and below the limit of quantitation (LOQ) were qualified as estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

There are no PALs established for the rinsate and trip blank samples.

Volatiles

All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater sample.

Analytical Data Usability Assessment

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

Volatiles

The project goals with respect to accuracy were met for the volatiles data set. Carbon tetrachloride, cyclohexane, cis-1,3-dichloropropene, and methylcyclohexane were qualified as estimated in select samples due to poor instrument calibration variability. Although specific method criteria were not met in this instance, data usability is not impacted and the affected non-detected results are usable as estimated values.

The project goals with respect to precision could not be fully evaluated for the volatiles data set since no precision-based QC was analyzed for the volatiles analysis in this SDG.

The project goals with respect to sensitivity were met for the volatiles data set with the following exception. All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater sample.

The project goals with respect to laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to laboratory data completeness.

PAH/PCB/GRO/DRO

The PAH, PCB, GRO, and DRO data sets was not assessed for data usability since there are no quality control indicators established for the rinsate and trip blank samples.

Tables: Data Summary Tables
 Data Validation Qualifiers and Codes

Enclosures: Data Validation Worksheets

Data Validation Qualifiers and Codes

Data Validation Qualifiers:

- = No qualifier attached to value (positive hit)
- J = Value is estimated
- U = Value is not detected
- UJ = Value is not detected and estimated
- R = Value (positive hit) is not usable
- UR = Value was reported as ND but is not usable

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- O = Poor Instrument Performance (e.g. base-line drifting)
- P = Uncertainty below quantitation limit ($< QL$ but $\geq MDL$)
- Q = Other problems (can encompass a number of issues; e.g. chromatography, interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = % Difference between columns/detectors $>25\%$ for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids $<30\%$
- Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125 SDG: CTOWE20_004 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-MW12-030311			DSY-SO-RB01-0311			DYS-GW-TB01-030311		
	LAB_ID	1103107-01			1103107-02			1103107-03		
	SAMP_DATE	3/3/2011			3/8/2011			3/8/2011		
	QC_TYPE	NM			RB			TB		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS									
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		0.5	U		0.5	U		0.5	U	
1,1,2,2-TETRACHLOROETHANE		0.5	U		0.5	U		0.5	U	
1,1,2-TRICHLOROETHANE		0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHANE		0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHENE		0.5	U		0.5	U		0.5	U	
1,2,4-TRICHLOROBENZENE		0.5	U		0.5	U		0.5	U	
1,2-DIBROMO-3-CHLOROPROPANE		1	U		1	U		1	U	
1,2-DIBROMOETHANE		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROETHANE		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROPROPANE		0.5	U		0.5	U		0.5	U	
1,3-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U	
1,4-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U	
2-BUTANONE		5	U		18.1			5	U	
2-HEXANONE		2.5	U		2.5	U		2.5	U	
4-METHYL-2-PENTANONE		2.5	U		2.5	U		2.5	U	
ACETONE		5	U		5.36	J	P	5	U	
BENZENE		0.5	U		0.5	U		0.5	U	
BROMODICHLOROMETHANE		0.5	U		0.5	U		0.5	U	
BROMOFORM		0.5	U		0.5	U		0.5	U	
BROMOMETHANE		1	U		1	U		1	U	
CARBON DISULFIDE		0.5	U		0.5	U		0.5	U	
CARBON TETRACHLORIDE		0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
CHLOROBENZENE		0.5	U		0.5	U		0.5	U	
CHLORODIBROMOMETHANE		0.5	U		0.5	U		0.5	U	
CHLOROETHANE		1	U		1	U		1	U	
CHLOROFORM		0.5	U		0.595	J	P	0.5	U	
CHLOROMETHANE		0.5	U		0.5	U		0.5	U	
CIS-1,2-DICHLOROETHENE		3.73			0.5	U		0.5	U	
CIS-1,3-DICHLOROPROPENE		0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
CYCLOHEXANE		0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
DICHLORODIFLUOROMETHANE		1	U		1	U		1	U	
ETHYLBENZENE		0.5	U		0.5	U		0.5	U	
ISOPROPYLBENZENE		0.5	U		0.5	U		0.5	U	
M+P-XYLENES		1	U		1	U		1	U	

PROJ_NO: 02125 SDG: CTOWE20_004 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-MW12-030311			DSY-SO-RB01-0311			DYS-GW-TB01-030311		
	LAB_ID	1103107-01			1103107-02			1103107-03		
	SAMP_DATE	3/3/2011			3/8/2011			3/8/2011		
	QC_TYPE	NM			RB			TB		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS									
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		1	U		1	U		1	U	
METHYL CYCLOHEXANE		0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
METHYL TERT-BUTYL ETHER		0.5	U		0.5	U		0.5	U	
METHYLENE CHLORIDE		1	U		1	U		1	U	
O-XYLENE		0.5	U		0.5	U		0.5	U	
STYRENE		0.5	U		0.5	U		0.5	U	
TETRACHLOROETHENE		0.5	U		0.5	U		0.5	U	
TOLUENE		0.5	U		0.5	U		0.5	U	
TOTAL XYLENES		1.5	U		1.5	U		1.5	U	
TRANS-1,2-DICHLOROETHENE		4.81			0.5	U		0.5	U	
TRANS-1,3-DICHLOROPROPENE		0.5	U		0.5	U		0.5	U	
TRICHLOROETHENE		9.61			0.5	U		0.5	U	
TRICHLOROFLUOROMETHANE		1	U		1	U		1	U	
VINYL CHLORIDE		0.5	U		0.5	U		0.5	U	

PROJ_NO: 02125 SDG: CTOWE20_004 FRACTION: PAH MEDIA: WATER	NSAMPLE	DSY-SO-RB01-0311		
	LAB_ID	1103107-02		
	SAMP_DATE	3/8/2011		
	QC_TYPE	RB		
	UNITS	UG/L		
	PCT_SOLIDS			
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		0.0943	U	
ACENAPHTHENE		0.0943	U	
ACENAPHTHYLENE		0.0943	U	
ANTHRACENE		0.0943	U	
BENZO(A)ANTHRACENE		0.0943	UJ	C
BENZO(A)PYRENE		0.0943	U	
BENZO(B)FLUORANTHENE		0.0943	U	
BENZO(G,H,I)PERYLENE		0.0943	U	
BENZO(K)FLUORANTHENE		0.0943	U	
CHRYSENE		0.0943	U	
DIBENZO(A,H)ANTHRACENE		0.0943	U	
FLUORANTHENE		0.0943	U	
FLUORENE		0.0943	U	
INDENO(1,2,3-CD)PYRENE		0.0943	U	
NAPHTHALENE		0.0789	J	P
PHENANTHRENE		0.0943	U	
PYRENE		0.0943	U	

PROJ_NO: 02125 SDG: CTOWE20_004 FRACTION: PCB MEDIA: WATER	NSAMPLE	DSY-SO-RB01-0311		
	LAB_ID	1103107-02		
	SAMP_DATE	3/8/2011		
	QC_TYPE	RB		
	UNITS	UG/L		
	PCT_SOLIDS			
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
AROCLOR-1016		0.236	U	
AROCLOR-1221		0.236	U	
AROCLOR-1232		0.236	U	
AROCLOR-1242		0.236	U	
AROCLOR-1248		0.236	U	
AROCLOR-1254		0.236	U	
AROCLOR-1260		0.236	U	

PROJ_NO: 02125 SDG: CTOWE20_004 FRACTION: PET MEDIA: WATER	NSAMPLE	DSY-SO-RB01-0311			DYS-GW-TB01-030311		
	LAB_ID	1103107-02			1103107-03		
	SAMP_DATE	3/8/2011			3/8/2011		
	QC_TYPE	RB			TB		
	UNITS	MG/L			MG/L		
	PCT_SOLIDS						
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIESEL RANGE ORGANICS		0.0935	U				
GASOLINE RANGE ORGANICS		0.1	U		0.1	U	



TETRA TECH NUS, INC.

RECORD OF REVIEW

1. TITLE AS IT APPEARS ON THE DOCUMENT – (See instruction #1 on reverse for definition of Documents):

DV Memo to T. Campbell, CTOWE20, On-Shore Derecktor Shipyard, Site 19, Naval Station Newport, Newport, Rhode Island

Tier II Organic Data Validation, SDG CTOWE20_005

2. DATE OF DOCUMENT: 5/3/11

DOCUMENT CONTROL No.: C-Nary-05-11-4327W

AUTHORS: J. Cardinal

TINUS JOB CHARGE No.: 112G02125-SADV

TYPE (DRAFT, DRAFT FINAL, FINAL): Final

SUBMITTAL DATE:

3. REVIEWER AND STATUS

REVIEWERS ASSIGNED BY:

Date

Assigned Reviewer (See Instruction #3)	Disapproval		Approved with Suggestions		Reviewer Requires Final Verification		Approved By	
	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) Lucy Gezman							AF	5/3/11
b)								
c)								
d)								

4. COMMENTS (Explain conditions and comments, or state where comments and edits are provided. Attach additional pages as needed):

5. AUTHOR COMMENTS/RESOLUTION:

6. APPROVAL FOR TRANSMITTAL:

DATE: _____

See #7 on Reverse for Authority to Approve Transmittals

**TETRA TECH NUS, INC****INTERNAL CORRESPONDENCE**

C-NAVY-04-11-4327W

Date: May 03, 2011

c: File G02125-4.10 (w/enc.-original)

To: T. Campbell (w/o enc.)

From: J. Cardinal (no copy)

Subject: Tier II Organic Data Validation, SDG CTOWE20_005
Empirical Laboratories, LLC
CTO WE20, Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19,
NAVSTA Newport, Newport, Rhode Island

VOC:

1/Groundwater/ DSY-GW-MW223-031611

1/Trip Blank/ DSY-GW-TB01-031611

VOC/PAH:

3/Groundwaters/ DSY-GW-DUP02-031611 DSY-GW-MW204-031711
DSY-GW-MW219-031611

(Field Duplicate Pair: DSY-GW-MW219-031611/DSY-GW-DUP02-031611)

1/Rinsate Blank/ DSY-GW-RB01-031611

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compounds (VOC) and polycyclic aromatic hydrocarbons (PAH) analytical data for the samples in this SDG. The samples were collected at the On-Shore Derecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI from March 16-17, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Derecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to USEPA SW-846 Method 8260B. The PAH analysis was performed according to USEPA SW-846 Method 8270C.

The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs). The data user should consider the most recent revisions to the applicable regulatory limits. The VOC and PAH data validation was performed in accordance with the Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- * • Preservation and Technical Holding Times

- *
 - GC/MS Instrument Performance Check (Tuning)
 - Initial and Continuing Calibrations
- *
 - Blanks
- *
 - Surrogate Compounds
- *
 - Internal Standards
- NA
 - Matrix Spike/Matrix Spike Duplicate
- *
 - Laboratory Control Sample/Laboratory Control Sample Duplicate
- *
 - Field Duplicates
 - Limits of Detection

* All criteria were met for this parameter.
NA Not applicable for this SDG.

Laboratory Data Completeness

The laboratory mistakenly logged in sample DSY-GW-MW204-031711 with the suffix "-031611" and the sample date 3/16/11 (actual sample date is 3/17/11). On April 25, 2011 the laboratory resubmitted all affected forms to correct the sample ID and sample date.

Volatiles

On April 19, 2011 the laboratory resubmitted the VOC logbook pages to show that the pH was <2 for all VOC samples since this information was not included in the original data package.

Initial and Continuing Calibrations

Volatiles

The following table summarizes the volatile compounds that failed to meet the continuing calibration (CC) criterion of %D <25:

Compound	%D	Action		Affected Samples
		(+)	NDs	
Chloroethane	26.7		UJ	All samples
Dichlorodifluoromethane	46.7		UJ	

Although the %D was outside of the QC limit for chloroethane and dichlorodifluoromethane, the project accuracy goals are not impacted since there are no project action limits established for these compounds for the samples in this SDG. The non-detected chloroethane and dichlorodifluoromethane results in the affected samples are usable as estimated values.

Limits of Detection

All non-detected results were reported at the limit of detection (LOD). Positive results above the detection limit (DL) and below the limit of quantitation (LOQ) were qualified as estimated (J) due to uncertainty below the LOQ. Project action limits (PALs) were evaluated for non-detected results (reported at the LOD) only.

There are no PALs established for the rinsate and trip blank samples.

Volatiles

All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

PAHs

All the PALs were met by the LOD values.

Analytical Data Usability Assessment

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

Volatiles

The project goals with respect to accuracy were met for the volatiles data set. Chloroethane and dichlorodifluoromethane were qualified as estimated in select samples due to poor instrument calibration variability. Although specific method criteria were not met in this instance, data usability is not impacted and the affected non-detected results are usable as estimated values.

The project goals with respect to sensitivity were met for the volatiles data set with the following exception. All PALs were met by the LODs except for 1,2-dibromo-3-chloropropane and 1,2-dibromoethane. Data usability may be impacted for these compounds for the groundwater samples.

The project goals with respect to precision and laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to precision and laboratory data completeness.

PAH

The project goals with respect to accuracy, precision, sensitivity, and laboratory data completeness were met for the PAH data set. Data usability is not impacted with regards to accuracy, precision, sensitivity, and laboratory data completeness.

Tables: Data Summary Tables
 Data Validation Qualifiers and Codes

Enclosures: Data Validation Worksheets

Data Validation Qualifiers and Codes

Data Validation Qualifiers:

- = No qualifier attached to value (positive hit)
- J = Value is estimated
- U = Value is not detected
- UJ = Value is not detected and estimated
- R = Value (positive hit) is not usable
- UR = Value was reported as ND but is not usable

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- O = Poor Instrument Performance (e.g. base-line drifting)
- P = Uncertainty below quantitation limit ($< QL$ but $\geq MDL$)
- Q = Other problems (can encompass a number of issues; e.g. chromatography, interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = % Difference between columns/detectors $>25\%$ for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids $<30\%$
- Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125 SDG: CTOWE20_005 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-DUP02-031611			DSY-GW-MW204-031711			DSY-GW-MW219-031611			DSY-GW-MW223-031611		
	LAB_ID	1103179-01			1103179-09			1103179-03			1103179-07		
	SAMP_DATE	3/16/2011			3/17/2011			3/16/2011			3/16/2011		
	QC_TYPE	FD			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF	DSY-GW-MW219-031611											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2,2-TETRACHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2-TRICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,1-DICHLOROETHENE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2,4-TRICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DIBROMO-3-CHLOROPROPANE		1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROPROPANE		0.5	U		0.5	U		0.5	U		0.5	U	
1,3-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
1,4-DICHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
2-BUTANONE		5	U		5	U		5	U		5	U	
2-HEXANONE		2.5	U		2.5	U		2.5	U		2.5	U	
4-METHYL-2-PENTANONE		2.5	U		2.5	U		2.5	U		2.5	U	
ACETONE		3.28	J	P	5	U		5	U		5	U	
BENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
BROMODICHLOROMETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
BROMOFORM		0.5	U		0.5	U		0.5	U		0.5	U	
BROMOMETHANE		1	U		1	U		1	U		1	U	
CARBON DISULFIDE		0.5	U		0.5	U		0.5	U		0.5	U	
CARBON TETRACHLORIDE		0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
CHLORODIBROMOMETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROETHANE		1	UJ	C	1	UJ	C	1	UJ	C	1	UJ	C
CHLOROFORM		0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROMETHANE		0.5	U		0.5	U		0.5	U		0.5	U	
CIS-1,2-DICHLOROETHENE		0.5	U		0.5	U		0.5	U		0.5	U	
CIS-1,3-DICHLOROPROPENE		0.5	U		0.5	U		0.5	U		0.5	U	
CYCLOHEXANE		0.5	U		0.5	U		0.5	U		0.5	U	
DICHLORODIFLUOROMETHANE		1	UJ	C	1	UJ	C	1	UJ	C	1	UJ	C
ETHYLBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
ISOPROPYLBENZENE		0.5	U		0.5	U		0.5	U		0.5	U	
M+P-XYLENES		1	U		1	U		1	U		1	U	

PROJ_NO: 02125 SDG: CTOWE20_005 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-RB01-031611			DSY-GW-TB01-031611		
	LAB_ID	1103179-05			1103179-08		
	SAMP_DATE	3/16/2011			3/16/2011		
	QC_TYPE	RB			TB		
	UNITS	UG/L			UG/L		
	PCT_SOLIDS						
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		0.5	U		0.5	U	
1,1,2,2-TETRACHLOROETHANE		0.5	U		0.5	U	
1,1,2-TRICHLOROETHANE		0.5	U		0.5	U	
1,1-DICHLOROETHANE		0.5	U		0.5	U	
1,1-DICHLOROETHENE		0.5	U		0.5	U	
1,2,4-TRICHLOROBENZENE		0.5	U		0.5	U	
1,2-DIBROMO-3-CHLOROPROPANE		1	U		1	U	
1,2-DIBROMOETHANE		0.5	U		0.5	U	
1,2-DICHLOROBENZENE		0.5	U		0.5	U	
1,2-DICHLOROETHANE		0.5	U		0.5	U	
1,2-DICHLOROPROPANE		0.5	U		0.5	U	
1,3-DICHLOROBENZENE		0.5	U		0.5	U	
1,4-DICHLOROBENZENE		0.5	U		0.5	U	
2-BUTANONE		18.3			5	U	
2-HEXANONE		2.5	U		2.5	U	
4-METHYL-2-PENTANONE		2.5	U		2.5	U	
ACETONE		6.12	J	P	5	U	
BENZENE		0.5	U		0.5	U	
BROMODICHLOROMETHANE		0.5	U		0.5	U	
BROMOFORM		0.5	U		0.5	U	
BROMOMETHANE		1	U		1	U	
CARBON DISULFIDE		0.5	U		0.5	U	
CARBON TETRACHLORIDE		0.5	U		0.5	U	
CHLOROBENZENE		0.5	U		0.5	U	
CHLORODIBROMOMETHANE		0.5	U		0.5	U	
CHLOROETHANE		1	UJ	C	1	UJ	C
CHLOROFORM		0.411	J	P	0.5	U	
CHLOROMETHANE		0.5	U		0.5	U	
CIS-1,2-DICHLOROETHENE		0.5	U		0.5	U	
CIS-1,3-DICHLOROPROPENE		0.5	U		0.5	U	
CYCLOHEXANE		0.5	U		0.5	U	
DICHLORODIFLUOROMETHANE		1	UJ	C	1	UJ	C
ETHYLBENZENE		0.5	U		0.5	U	
ISOPROPYLBENZENE		0.5	U		0.5	U	
M+P-XYLENES		1	U		1	U	

PROJ_NO: 02125 SDG: CTOWE20_005 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-DUP02-031611			DSY-GW-MW204-031711			DSY-GW-MW219-031611			DSY-GW-MW223-031611		
	LAB_ID	1103179-01			1103179-09			1103179-03			1103179-07		
	SAMP_DATE	3/16/2011			3/17/2011			3/16/2011			3/16/2011		
	QC_TYPE	FD			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF	DSY-GW-MW219-031611											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		1	U		1	U		1	U		1	U	
METHYL CYCLOHEXANE		0.5	U		0.5	U		0.5	U		0.5	U	
METHYL TERT-BUTYL ETHER		0.5	U		0.5	U		0.5	U		0.5	U	
METHYLENE CHLORIDE		1	U		1	U		1	U		1	U	
O-XYLENE		0.5	U		0.5	U		0.5	U		0.5	U	
STYRENE		0.5	U		0.5	U		0.5	U		0.5	U	
TETRACHLOROETHENE		0.5	U		0.5	U		0.5	U		0.5	U	
TOLUENE		0.5	U		0.5	U		0.5	U		0.5	U	
TOTAL XYLENES		1.5	U		1.5	U		1.5	U		1.5	U	
TRANS-1,2-DICHLOROETHENE		0.5	U		0.5	U		0.5	U		0.5	U	
TRANS-1,3-DICHLOROPROPENE		0.5	U		0.5	U		0.5	U		0.5	U	
TRICHLOROETHENE		0.5	U		3.16			0.5	U		0.5	U	
TRICHLOROFLUOROMETHANE		1	U		1	U		1	U		1	U	
VINYL CHLORIDE		0.5	U		0.5	U		0.5	U		0.5	U	

PROJ_NO: 02125 SDG: CTOWE20_005 FRACTION: OV MEDIA: WATER	NSAMPLE	DSY-GW-RB01-031611			DSY-GW-TB01-031611		
	LAB_ID	1103179-05			1103179-08		
	SAMP_DATE	3/16/2011			3/16/2011		
	QC_TYPE	RB			TB		
	UNITS	UG/L			UG/L		
	PCT_SOLIDS						
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		1	U		1	U	
METHYL CYCLOHEXANE		0.5	U		0.5	U	
METHYL TERT-BUTYL ETHER		0.5	U		0.5	U	
METHYLENE CHLORIDE		1	U		1	U	
O-XYLENE		0.5	U		0.5	U	
STYRENE		0.5	U		0.5	U	
TETRACHLOROETHENE		0.5	U		0.5	U	
TOLUENE		0.5	U		0.5	U	
TOTAL XYLENES		1.5	U		1.5	U	
TRANS-1,2-DICHLOROETHENE		0.5	U		0.5	U	
TRANS-1,3-DICHLOROPROPENE		0.5	U		0.5	U	
TRICHLOROETHENE		0.5	U		0.5	U	
TRICHLOROFLUOROMETHANE		1	U		1	U	
VINYL CHLORIDE		0.5	U		0.5	U	

PROJ_NO: 02125 SDG: CTOWE20_005 FRACTION: PAH MEDIA: WATER	NSAMPLE	DSY-GW-DUP02-031611			DSY-GW-MW204-031711			DSY-GW-MW219-031611			DSY-GW-RB01-031611		
	LAB_ID	1103179-01			1103179-09			1103179-03			1103179-05		
	SAMP_DATE	3/16/2011			3/17/2011			3/16/2011			3/16/2011		
	QC_TYPE	FD			NM			NM			RB		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS												
	DUP_OF	DSY-GW-MW219-031611											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
ACENAPHTHENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
ACENAPHTHYLENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
ANTHRACENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
BENZO(A)ANTHRACENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
BENZO(A)PYRENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
BENZO(B)FLUORANTHENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
BENZO(G,H,I)PERYLENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
BENZO(K)FLUORANTHENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
CHRYSENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
DIBENZO(A,H)ANTHRACENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
FLUORANTHENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
FLUORENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
INDENO(1,2,3-CD)PYRENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
NAPHTHALENE		0.0943	U		0.0962	U		0.0943	U		0.0724	J	P
PHENANTHRENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	
PYRENE		0.0943	U		0.0962	U		0.0943	U		0.0962	U	



TETRA TECH NUS, INC.

RECORD OF REVIEW

1. TITLE AS IT APPEARS ON THE DOCUMENT – (See instruction #1 on reverse for definition of Documents):

**DV Memo to T. Campbell, CTOWE20, ON SHORE DERECKTOR SHIPYARD, SITE 19, NAVAL STATION
NEWPORT, NEWPORT, RHODE ISLAND**

Tier II Organic Data Validation, SDG CTOWE20_001

2. DATE OF DOCUMENT: 4/4/11

DOCUMENT CONTROL No.: C-Havy-04-11-4268 w

AUTHORS: J. Cardinal

TINUS JOB CHARGE No.: 112G02125 - SA.DV

TYPE (DRAFT, DRAFT FINAL, FINAL): Final

SUBMITTAL DATE:

3. REVIEWER AND STATUS

REVIEWERS ASSIGNED BY:

Date

Assigned Reviewer (See Instruction #3)	Disapproval		Approved with Suggestions		Reviewer Requires Final Verification		Approved By	
	Initials	(Date)	Initials	(Date)	Initials	(Date)	Initials	(Date)
a) <i>Lucy Guzman</i>							<i>JK</i>	4/5/11
b)								
c)								
d)								

4. COMMENTS (Explain conditions and comments, or state where comments and edits are provided. Attach additional pages as needed):

5. AUTHOR COMMENTS/RESOLUTION:

6. APPROVAL FOR TRANSMITTAL:

DATE: _____

See #7 on Reverse for Authority to Approve Transmittals

**TETRA TECH NUS, INC****INTERNAL CORRESPONDENCE**

C-NAVY-04-11-4268W

Date: April 04, 2011

c: File G02025-4.10 (w/enc.-original)

To: T. Campbell (w/o enc.)

From: J. Cardinal (no copy) *JD*

Subject: Tier II Organic Data Validation, SDG CTOWE20_001
Empirical Laboratories, LLC
CTO WE20, Study Area Screening Evaluation, On-Shore Dereecktor Shipyard, Site 19,
NAVSTA Newport, Newport, Rhode Island

VOC/PAH/DRO/GRO:

9/Soils/

DSY-SB204-SO-0002 DSY-SB204-SO-0810

DSY-SB205-SO-0002 DSY-SB205-SO-088.5

DSY-SB206-SO-0002 DSY-SB206-SO-0810

DSY-SB207-SO-0002 DSY-SB207-SO-1012

DSY-SO-DUP01-021411

(Field Duplicate Pair: DSY-SB204-SO-0002/DSY-SO-DUP01-021411)

VOC/GRO:

1/Trip Blank/

DSY-SO-TB01-021111

PAH:

2/Soils/

DSY-SB201-SO-0204 DSY-SB202-SO-0204

Tetra Tech NUS, Inc. (TtNUS) performed a Tier II data validation on the volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAH), diesel range organic (DRO; C8-C40), and gasoline range organic (GRO; C6-C10) analytical data for the samples in this SDG. The samples were collected at the On-Shore Dereecktor Shipyard, Site 19 at NAVSTA Newport, Newport, RI from February 9-15, 2011. Sample collection and analysis were performed according to the Work Plan Addendum 1 for Study Area Screening Evaluation, On-Shore Dereecktor Shipyard, Site 19, NAVSTA Newport, Newport, Rhode Island; dated February 2011.

The VOC analysis was performed according to USEPA SW-846 Method 8260B. The PAH analysis was performed according to USEPA SW-846 Method 8270C. The DRO and GRO analyses were performed according to USEPA SW-846 Method 8015B.

The project specific criteria listed in the site Work Plan Addendum 1 were applied for validation of the data, including project action limits (PALs) listed in Table A-2. The data user should consider the most recent revisions to the applicable regulatory limits. The VOC, PAH, DRO, and GRO data validation was performed in accordance with the Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996.

The sample results, validation qualifiers (VQL), and qualifier codes (QLCD) are presented in the enclosed data summary tables. A list of the qualifier codes, which provide the reasons for the validation qualifiers, is enclosed.

The data were evaluated based on the following parameters:

- Laboratory Data Completeness
- * • Preservation and Technical Holding Times
- * • GC/MS Instrument Performance Check (Tuning)
- Initial and Continuing Calibrations
- Blanks
- * • Surrogate Compounds
- * • Internal Standards
- * • Matrix Spike/Matrix Spike Duplicate
- * • Laboratory Control Sample/Laboratory Control Sample Duplicate
- * • Field Duplicates
- * • Percent Solids
- Limits of Detection

* All criteria were met for this parameter.

Laboratory Data Completeness

Volatiles

On March 17, 2011 the laboratory clarified that DoD limits were applied for the LCS/LCSD and surrogates for the volatiles analysis.

PAH

Select samples were analyzed at dilution only. On March 17, 2011 the laboratory clarified that samples were diluted due to matrix interferences. These samples were not analyzed at lower dilution. No further action was taken.

On March 17, 2011 the laboratory clarified that the low-level PAH LCS/LCSD and surrogate limits applied are from AFCEE 4.02 as DoD does not address low-level PAHs by Method 8270 as indicated in proposal note 10. No further action was taken.

DRO

For the DRO samples the limit of quantitation (LOQ) is equal to the detection limit (DL) and limit of detection (LOD). On March 17, 2011 the laboratory clarified that no results are reported less than the LOQ for DRO. No further action was taken.

Initial and Continuing Calibrations

Volatiles

The following table summarizes the volatile compound that failed to meet the initial calibration verification criterion of %D <20%:

Compound	%D	Action		Affected Samples
		(+)	NDs	
Dichlorodifluoromethane	40.7		UJ	All samples

Although initial calibration verification %D for dichlorodifluoromethane was above the QC limit, the project accuracy goals are not impacted since the affected sample results are more than an order of magnitude below the PAL. The non-detected dichlorodifluoromethane results in the affected samples are usable as estimated values.

The following table summarizes the volatile compounds that failed to meet the continuing calibration (CC) criterion of %D <20 for CCCs or <25% for the other compounds:

Compound	%D	Action		Affected Samples
		(+)	NDs	
Acetone	-25.4	J	UJ	All samples except DSY-SB207-SO-0002 and DSY-SO-TB01-021111
Bromoform	25.6		UJ	
1,2-Dibromo-3-chloropropane	27.3,		UJ	DSY-SB207-SO-0002
Bromomethane	99.6		UJ	DSY-SO-TB01-021111
2-Butanone	27.6		UJ	
2-Hexanone	30.3		UJ	
Methyl acetate	25.6	J		

Although the %D was outside of the QC limit for acetone, bromoform, 1,2-dibromo-3-chloropropane, bromomethane, 2-butanone, 2-hexanone, and methyl acetate; the project accuracy goals are not impacted since the affected sample results are below the PAL and there are no regulatory limits established for the trip blank sample. The positive and non-detected acetone, bromoform, 1,2-dibromo-3-chloropropane, bromomethane, 2-butanone, 2-hexanone, and methyl acetate results in the affected samples are usable as estimated values.

PAH

The following table summarizes the PAH compound that failed to meet the continuing calibration (CC) criterion of %D <25:

Compound	%D	Action		Affected Samples
		(+)	NDs	
Benzo(a)anthracene	33.7	J	UJ	All samples

The %D was outside of the QC limit for benzo(a)anthracene; therefore, the project accuracy goals may be impacted. The positive and non-detected benzo(a)anthracene results in the affected samples are usable as estimated values.

Blanks

Volatiles

The following table summarizes the level of blank contamination detected in the trip blank associated with the samples.

Compound	Type of Blank	Maximum Conc. (µg/Kg)	Action Level (µg/Kg)	Affected Samples
Methylene chloride	Trip	8.6	86	All samples except DSY-SO-TB01-021111

Blank actions were applied to the affected soil samples due to methylene chloride trip blank contamination. The 10x rule applies for methylene chloride. Positive results below the blank action levels were changed to non-detected values (U) at the sample results.

Although methylene chloride contamination were found in the trip blank, the project sensitivity goals are not impacted since the non-detected values do not exceed the project action limit for methylene chloride. The methylene chloride results in the affected soil samples are usable as non-detected values.

Limits of Detection

The VOC, GRO, and PAH non-detected results were reported at the limit of detection (LOD). Positive results above the detection limit (DL) and below the limit of quantitation (LOQ) were qualified as estimated (J) due to uncertainty below the LOQ. The non-detected results for are reported at the LOQ. Project action limits (PALs) were evaluated for non-detected results only.

There are no PALs established for the trip blank sample.

Volatiles

All PALs were met by the LODs.

Results for methylene chloride in select samples were changed to non-detected values due to blank contamination. As discussed above in the Blanks section, data usability is not impacted.

PAH

Samples DSY-SB204-SO-0002, DSY-SB205-SO-0002, DSY-SB207-SO-0002, and DSY-SO-DUP01-021411 were analyzed at 5x dilution.

All PALs were met by the LODs except for dibenzo(a,h)anthracene and benzo(a)pyrene. Data usability may be impacted for these compounds for the soil samples.

DRO

The PAL was met by the LOQs.

GRO

The PAL was met by the LODs.

Analytical Data Usability Assessment

The data usability assessment was performed to determine if the analytical data reported by the laboratory for this SDG met the project data quality objectives for acceptable accuracy, precision, sensitivity, and completeness; and to determine and define the impact of the exceeded quality control indicators on the technical usability of the data. Please refer to the specific sections in the above validation report for further details.

This is a partial evaluation based on laboratory quality control (QC) and limited field information available at the time of the assessment. A comprehensive project data usability assessment will be performed later when all data are available.

Volatiles

The project goals with respect to accuracy were met for the volatiles data set. Dichlorodifluoromethane was qualified as estimated in select samples due to poor initial calibration verification performance. Acetone, bromoform, 1,2-dibromo-3-chloropropane, bromomethane, 2-butanone, 2-hexanone, and methyl acetate were qualified as estimated in select samples due to instrument calibration variability. Although specific method criteria were not met in these instances, data usability is not impacted and the affected positive and non-detected results are usable as estimated values.

The project goals with respect to precision, sensitivity, and laboratory data completeness were met for the volatiles data set. Data usability is not impacted with regards to precision, sensitivity, and laboratory data completeness.

PAH

The project goals with respect to accuracy were met for the PAH data set with the following exception. Benzo(a)anthracene was qualified as estimated in all samples due to instrument calibration variability. Although specific method criteria were not met in this instance, the affected positive and non-detected results are usable as estimated values which may have a minor impact on data usability.

The project goals with respect to sensitivity were met for the PAH data set with the following exception. All PALs were met by the LODs except for dibenzo(a,h)anthracene and benzo(a)pyrene. Data usability may be impacted for these compounds for the soil samples.

Memo to T. Campbell
April 04, 2011
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The project goals with respect to precision and laboratory data completeness were met for the PAH data set. Data usability is not impacted with regards to precision and laboratory data completeness.

DRO and GRO

The project goals with respect to accuracy, precision, sensitivity, and laboratory data completeness were met for the DRO and GRO data set. Data usability is not impacted with regards to accuracy, precision, sensitivity, and laboratory data completeness.

Tables: Data Summary Tables
 Data Validation Qualifiers and Codes

Enclosures: Data Validation Worksheets

Data Validation Qualifiers and Codes

Data Validation Qualifiers:

- = No qualifier attached to value (positive hit)
- J = Value is estimated
- U = Value is not detected
- UJ = Value is not detected and estimated
- R = Value (positive hit) is not usable
- UR = Value was reported as ND but is not usable

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- O = Poor Instrument Performance (e.g. base-line drifting)
- P = Uncertainty below quantitation limit ($< QL$ but $\geq MDL$)
- Q = Other problems (can encompass a number of issues; e.g. chromatography, interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = % Difference between columns/detectors $>25\%$ for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids $<30\%$
- Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: OV MEDIA: SOIL	NSAMPLE	DSY-SB204-SO-0002			DSY-SB204-SO-0810			DSY-SB205-SO-0002			DSY-SB205-SO-088.5		
	LAB_ID	1102160-05			1102160-03			1102160-09			1102160-10		
	SAMP_DATE	2/14/2011			2/11/2011			2/15/2011			2/15/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	91.5			93.5			85.7			93.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		2.76	U		2.65	U		2.72	U		2.18	U	
1,1,2,2-TETRACHLOROETHANE		2.76	U		2.65	U		2.72	U		2.18	U	
1,1,2-TRICHLOROETHANE		2.76	U		2.65	U		2.72	U		2.18	U	
1,1-DICHLOROETHANE		2.76	U		2.65	U		2.72	U		2.18	U	
1,1-DICHLOROETHENE		2.76	U		2.65	U		2.72	U		2.18	U	
1,2,4-TRICHLOROBENZENE		2.76	U		2.65	U		2.72	U		2.18	U	
1,2-DIBROMO-3-CHLOROPROPANE		5.52	U		5.3	U		5.43	U		4.36	U	
1,2-DIBROMOETHANE		2.76	U		2.65	U		2.72	U		2.18	U	
1,2-DICHLOROBENZENE		2.76	U		2.65	U		2.72	U		2.18	U	
1,2-DICHLOROETHANE		2.76	U		2.65	U		2.72	U		2.18	U	
1,2-DICHLOROPROPANE		2.76	U		2.65	U		2.72	U		2.18	U	
1,3-DICHLOROBENZENE		2.76	U		2.65	U		2.72	U		2.18	U	
1,4-DICHLOROBENZENE		2.76	U		2.65	U		2.72	U		2.18	U	
2-BUTANONE		5.52	U		5.3	U		5.43	U		4.36	U	
2-HEXANONE		2.76	U		2.65	U		2.72	U		2.18	U	
4-METHYL-2-PENTANONE		2.76	U		2.65	U		2.72	U		2.18	U	
ACETONE		11	UJ	C	10.6	UJ	C	27.3	J	C	8.73	UJ	C
BENZENE		2.76	U		2.65	U		2.72	U		2.18	U	
BROMODICHLOROMETHANE		2.76	U		2.65	U		2.72	U		2.18	U	
BROMOFORM		2.76	U		2.65	U		2.72	U		2.18	U	
BROMOMETHANE		5.52	U		5.3	U		5.43	U		4.36	U	
CARBON DISULFIDE		2.76	U		2.65	U		3.28	J	P	2.6	J	P
CARBON TETRACHLORIDE		2.76	U		2.65	U		2.72	U		2.18	U	
CHLOROBENZENE		2.76	U		2.65	U		2.72	U		2.18	U	
CHLORODIBROMOMETHANE		2.76	U		2.65	U		2.72	U		2.18	U	
CHLOROETHANE		5.52	U		5.3	U		5.43	U		4.36	U	
CHLOROFORM		2.76	U		2.65	U		2.72	U		2.18	U	
CHLOROMETHANE		5.52	U		5.3	U		5.43	U		4.36	U	
CIS-1,2-DICHLOROETHENE		2.76	U		2.65	U		2.72	U		2.18	U	
CIS-1,3-DICHLOROPROPENE		2.76	U		2.65	U		2.72	U		2.18	U	
CYCLOHEXANE		2.76	U		2.65	U		2.72	U		2.18	U	
DICHLORODIFLUOROMETHANE		5.52	UJ	C	5.3	UJ	C	5.43	UJ	C	4.36	UJ	C
ETHYLBENZENE		2.76	U		2.65	U		2.72	U		2.18	U	
ISOPROPYLBENZENE		2.76	U		2.65	U		2.72	U		2.18	U	
M+P-XYLENES		5.52	U		2.8	J	P	5.43	U		4.36	U	

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: OV MEDIA: SOIL	NSAMPLE	DSY-SB206-SO-0002			DSY-SB206-SO-0810			DSY-SB207-SO-0002			DSY-SB207-SO-1012		
	LAB_ID	1102160-06			1102160-07			1102160-11RE1			1102160-12		
	SAMP_DATE	2/14/2011			2/14/2011			2/15/2011			2/15/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	93.0			94.4			93.7			88.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		1.96	U		2.51	U		2.09	U		2.16	U	
1,1,2,2-TETRACHLOROETHANE		1.96	U		2.51	U		2.09	U		2.16	U	
1,1,2-TRICHLOROETHANE		1.96	U		2.51	U		2.09	U		2.16	U	
1,1-DICHLOROETHANE		1.96	U		2.51	U		2.09	U		2.16	U	
1,1-DICHLOROETHENE		1.96	U		2.51	U		2.09	U		2.16	U	
1,2,4-TRICHLOROBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
1,2-DIBROMO-3-CHLOROPROPANE		3.92	U		5.03	U		4.17	UJ	C	4.32	U	
1,2-DIBROMOETHANE		1.96	U		2.51	U		2.09	U		2.16	U	
1,2-DICHLOROBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
1,2-DICHLOROETHANE		1.96	U		2.51	U		2.09	U		2.16	U	
1,2-DICHLOROPROPANE		1.96	U		2.51	U		2.09	U		2.16	U	
1,3-DICHLOROBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
1,4-DICHLOROBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
2-BUTANONE		3.92	U		5.03	U		4.17	U		4.32	U	
2-HEXANONE		1.96	U		2.51	U		2.09	U		2.16	U	
4-METHYL-2-PENTANONE		1.96	U		2.51	U		2.09	U		2.16	U	
ACETONE		9.96	J	CP	10.1	UJ	C	16.5	J	P	8.63	UJ	C
BENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
BROMODICHLOROMETHANE		1.96	U		2.51	U		2.09	U		2.16	U	
BROMOFORM		1.96	U		2.51	U		2.09	U		2.16	U	
BROMOMETHANE		3.92	U		5.03	U		4.17	U		4.32	U	
CARBON DISULFIDE		1.96	U		2.51	U		2.09	U		2.16	U	
CARBON TETRACHLORIDE		1.96	U		2.51	U		2.09	U		2.16	U	
CHLOROBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
CHLORODIBROMOMETHANE		1.96	U		2.51	U		2.09	U		2.16	U	
CHLOROETHANE		3.92	U		5.03	U		4.17	U		4.32	U	
CHLOROFORM		1.96	U		2.51	U		2.09	U		2.16	U	
CHLOROMETHANE		3.92	U		5.03	U		4.17	U		4.32	U	
CIS-1,2-DICHLOROETHENE		1.96	U		2.51	U		2.09	U		2.16	U	
CIS-1,3-DICHLOROPROPENE		1.96	U		2.51	U		2.09	U		2.16	U	
CYCLOHEXANE		1.96	U		2.51	U		2.09	U		2.16	U	
DICHLORODIFLUOROMETHANE		3.92	UJ	C	5.03	UJ	C	4.17	UJ	C	4.32	UJ	C
ETHYLBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
ISOPROPYLBENZENE		1.96	U		2.51	U		2.09	U		2.16	U	
M+P-XYLENES		3.92	U		5.03	U		4.17	U		4.32	U	

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: OV MEDIA: SOIL	NSAMPLE	DSY-SO-DUP01-021411			DSY-SO-TB01-021111		
	LAB_ID	1102160-08			1102160-04		
	SAMP_DATE	2/14/2011			2/11/2011		
	QC_TYPE	FD			TB		
	UNITS	UG/KG			UG/KG		
	PCT_SOLIDS	90.1					
	DUP_OF	DSY-SB204-SO-0002					
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		2.5 U			2.5 U		
1,1,2,2-TETRACHLOROETHANE		2.5 U			2.5 U		
1,1,2-TRICHLOROETHANE		2.5 U			2.5 U		
1,1-DICHLOROETHANE		2.5 U			2.5 U		
1,1-DICHLOROETHENE		2.5 U			2.5 U		
1,2,4-TRICHLOROBENZENE		2.5 U			2.5 U		
1,2-DIBROMO-3-CHLOROPROPANE		5 U			5 U		
1,2-DIBROMOETHANE		2.5 U			2.5 U		
1,2-DICHLOROBENZENE		2.5 U			2.5 U		
1,2-DICHLOROETHANE		2.5 U			2.5 U		
1,2-DICHLOROPROPANE		2.5 U			2.5 U		
1,3-DICHLOROBENZENE		2.5 U			2.5 U		
1,4-DICHLOROBENZENE		2.5 U			2.5 U		
2-BUTANONE		3.26 J	P		5 UJ	C	
2-HEXANONE		4.96 J	P		2.5 UJ	C	
4-METHYL-2-PENTANONE		2.5 U			2.5 U		
ACETONE		31.4 J	C		10 U		
BENZENE		2.5 U			2.5 U		
BROMODICHLOROMETHANE		2.5 U			2.5 U		
BROMOFORM		2.5 U			2.5 UJ	C	
BROMOMETHANE		5 U			5 UJ	C	
CARBON DISULFIDE		2.5 U			2.5 U		
CARBON TETRACHLORIDE		2.5 U			2.5 U		
CHLOROBENZENE		2.5 U			2.5 U		
CHLORODIBROMOMETHANE		2.5 U			2.5 U		
CHLOROETHANE		5 U			5 U		
CHLOROFORM		2.5 U			2.5 U		
CHLOROMETHANE		5 U			5 U		
CIS-1,2-DICHLOROETHENE		2.5 U			2.5 U		
CIS-1,3-DICHLOROPROPENE		2.5 U			2.5 U		
CYCLOHEXANE		2.5 U			2.5 U		
DICHLORODIFLUOROMETHANE		5 UJ	C		5 UJ	C	
ETHYLBENZENE		2.5 U			2.5 U		
ISOPROPYLBENZENE		2.5 U			2.5 U		
M+P-XYLENES		5 U			5 U		

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: OV MEDIA: SOIL	NSAMPLE	DSY-SB204-SO-0002			DSY-SB204-SO-0810			DSY-SB205-SO-0002			DSY-SB205-SO-088.5		
	LAB_ID	1102160-05			1102160-03			1102160-09			1102160-10		
	SAMP_DATE	2/14/2011			2/11/2011			2/15/2011			2/15/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	91.5			93.5			85.7			93.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		5.52	U		5.3	U		5.43	U		4.36	U	
METHYL CYCLOHEXANE		2.76	U		2.65	U		2.72	U		2.18	U	
METHYL TERT-BUTYL ETHER		2.76	U		2.65	U		2.72	U		2.18	U	
METHYLENE CHLORIDE		9.69	UJ	BP	21	U	B	9.67	UJ	BP	5.23	UJ	BP
O-XYLENE		2.76	U		2.65	U		2.72	U		2.18	U	
STYRENE		2.76	U		2.65	U		2.72	U		2.18	U	
TETRACHLOROETHENE		2.76	U		2.65	U		2.72	U		2.18	U	
TOLUENE		2.76	U		2.65	U		2.72	U		2.18	U	
TOTAL XYLENES		8.28	U		7.95	U		8.15	U		6.54	U	
TRANS-1,2-DICHLOROETHENE		2.76	U		2.65	U		2.72	U		2.18	U	
TRANS-1,3-DICHLOROPROPENE		2.76	U		2.65	U		2.72	U		2.18	U	
TRICHLOROETHENE		2.76	U		2.65	U		2.72	U		2.18	U	
TRICHLOROFLUOROMETHANE		5.52	U		5.3	U		5.43	U		4.36	U	
VINYL CHLORIDE		2.76	U		2.65	U		2.72	U		2.18	U	

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: OV MEDIA: SOIL	NSAMPLE	DSY-SB206-SO-0002			DSY-SB206-SO-0810			DSY-SB207-SO-0002			DSY-SB207-SO-1012		
	LAB_ID	1102160-06			1102160-07			1102160-11RE1			1102160-12		
	SAMP_DATE	2/14/2011			2/14/2011			2/15/2011			2/15/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	93.0			94.4			93.7			88.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		3.92	U		5.03	U		4.17	U		4.32	U	
METHYL CYCLOHEXANE		1.96	U		2.51	U		2.09	U		2.16	U	
METHYL TERT-BUTYL ETHER		1.96	U		2.51	U		2.09	U		2.16	U	
METHYLENE CHLORIDE		4.31	UJ	BP	7.87	UJ	BP	7.26	UJ	BP	6.67	UJ	BP
O-XYLENE		1.96	U		2.51	U		2.09	U		2.16	U	
STYRENE		1.96	U		2.51	U		2.09	U		2.16	U	
TETRACHLOROETHENE		1.96	U		2.51	U		2.09	U		2.16	U	
TOLUENE		1.96	U		2.51	U		2.09	U		2.16	U	
TOTAL XYLENES		5.88	U		7.54	U		6.26	U		6.47	U	
TRANS-1,2-DICHLOROETHENE		1.96	U		2.51	U		2.09	U		2.16	U	
TRANS-1,3-DICHLOROPROPENE		1.96	U		2.51	U		2.09	U		2.16	U	
TRICHLOROETHENE		1.96	U		2.51	U		2.09	U		2.16	U	
TRICHLOROFLUOROMETHANE		3.92	U		5.03	U		4.17	U		4.32	U	
VINYL CHLORIDE		1.96	U		2.51	U		2.09	U		2.16	U	

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: OV MEDIA: SOIL	NSAMPLE	DSY-SO-DUP01-021411			DSY-SO-TB01-021111		
	LAB_ID	1102160-08			1102160-04		
	SAMP_DATE	2/14/2011			2/11/2011		
	QC_TYPE	FD			TB		
	UNITS	UG/KG			UG/KG		
	PCT_SOLIDS	90.1					
	DUP_OF	DSY-SB204-SO-0002					
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
METHYL ACETATE		5 U			5 UJ		C
METHYL CYCLOHEXANE		2.5 U			2.5 U		
METHYL TERT-BUTYL ETHER		2.5 U			2.5 U		
METHYLENE CHLORIDE		10.5 U	B		8.6 J		P
O-XYLENE		2.5 U			2.5 U		
STYRENE		2.5 U			2.5 U		
TETRACHLOROETHENE		2.5 U			2.5 U		
TOLUENE		2.5 U			2.5 U		
TOTAL XYLENES		7.5 U			7.5 U		
TRANS-1,2-DICHLOROETHENE		2.5 U			2.5 U		
TRANS-1,3-DICHLOROPROPENE		2.5 U			2.5 U		
TRICHLOROETHENE		2.5 U			2.5 U		
TRICHLOROFLUOROMETHANE		5 U			5 U		
VINYL CHLORIDE		2.5 U			2.5 U		

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: PAH MEDIA: SOIL	NSAMPLE	DSY-SB201-SO-0204			DSY-SB202-SO-0204			DSY-SB204-SO-0002			DSY-SB204-SO-0810		
	LAB_ID	1102160-02			1102160-01			1102160-05			1102160-03		
	SAMP_DATE	2/11/2011			2/9/2011			2/14/2011			2/11/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	88.1			90.6			91.5			93.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		3.66	U		3.61	U		18	U		3.42	U	
ACENAPHTHENE		3.66	U		3.61	U		18	U		3.42	U	
ACENAPHTHYLENE		3.66	U		3.61	U		18	U		3.42	U	
ANTHRACENE		3.66	U		3.61	U		18	U		3.42	U	
BENZO(A)ANTHRACENE		3.66	UJ	C	3.61	UJ	C	22.5	J	CP	3.42	UJ	C
BENZO(A)PYRENE		3.66	U		3.61	U		14.5	J	P	3.42	U	
BENZO(B)FLUORANTHENE		3.66	U		3.61	U		22.1	J	P	3.42	U	
BENZO(G,H,I)PERYLENE		3.66	U		3.61	U		18	U		3.42	U	
BENZO(K)FLUORANTHENE		3.66	U		3.61	U		18	U		3.42	U	
CHRYSENE		3.66	U		3.61	U		24.1	J	P	3.42	U	
DIBENZO(A,H)ANTHRACENE		3.66	U		3.61	U		18	U		3.42	U	
FLUORANTHENE		3.66	U		3.61	U		31	J	P	3.42	U	
FLUORENE		3.66	U		3.61	U		18	U		3.42	U	
INDENO(1,2,3-CD)PYRENE		3.66	U		3.61	U		15.1	J	P	3.42	U	
NAPHTHALENE		3.66	U		3.61	U		18	U		3.42	U	
PHENANTHRENE		3.66	U		3.61	U		13.6	J	P	3.42	U	
PYRENE		3.66	U		3.61	U		31.2	J	P	3.42	U	

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: PAH MEDIA: SOIL	NSAMPLE	DSY-SB205-SO-0002			DSY-SB205-SO-088.5			DSY-SB206-SO-0002			DSY-SB206-SO-0810		
	LAB_ID	1102160-09			1102160-10			1102160-06			1102160-07		
	SAMP_DATE	2/15/2011			2/15/2011			2/14/2011			2/14/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	85.7			93.3			93.0			94.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		18.9	U		3.48	U		3.56	U		3.53	U	
ACENAPHTHENE		17.8	J	P	3.62	J	P	3.56	U		3.53	U	
ACENAPHTHYLENE		19.9	J	P	3.53	J	P	3.56	U		3.53	U	
ANTHRACENE		51.1			8			3.56	U		3.53	U	
BENZO(A)ANTHRACENE		232	J	C	27	J	C	3.56	UJ	C	3.53	UJ	C
BENZO(A)PYRENE		165			23.3			3.56	U		3.53	U	
BENZO(B)FLUORANTHENE		263			41.1			3.56	U		3.53	U	
BENZO(G,H,I)PERYLENE		119			21.6			1.92	J	P	3.53	U	
BENZO(K)FLUORANTHENE		92.4			11.2			3.56	U		3.53	U	
CHRYSENE		238			32.1			3.56	U		3.53	U	
DIBENZO(A,H)ANTHRACENE		124			23.3			3.56	U		3.53	U	
FLUORANTHENE		424			55.3			3.56	U		3.53	U	
FLUORENE		21.7	J	P	2.93	J	P	3.56	U		3.53	U	
INDENO(1,2,3-CD)PYRENE		99.1			18			3.56	U		3.53	U	
NAPHTHALENE		18.9	U		3.54	J	P	3.56	U		3.53	U	
PHENANTHRENE		235			30.8			3.56	U		3.53	U	
PYRENE		371			47.4			3.05	J	P	3.53	U	

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: PAH MEDIA: SOIL	NSAMPLE	DSY-SB207-SO-0002			DSY-SB207-SO-1012			DSY-SO-DUP01-021411		
	LAB_ID	1102160-11			1102160-12			1102160-08		
	SAMP_DATE	2/15/2011			2/15/2011			2/14/2011		
	QC_TYPE	NM			NM			FD		
	UNITS	UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	93.7			88.7			90.1		
	DUP_OF							DSY-SB204-SO-0002		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		14.5	J	P	3.63	U		17.9	U	
ACENAPHTHENE		17.2	U		3.63	U		17.9	U	
ACENAPHTHYLENE		17.2	U		3.63	U		17.9	U	
ANTHRACENE		17.2	U		3.63	U		17.9	U	
BENZO(A)ANTHRACENE		31.8	J	CP	3.63	UJ	C	17.9	UJ	C
BENZO(A)PYRENE		29.6	J	P	3.63	U		17.9	U	
BENZO(B)FLUORANTHENE		54			2.65	J	P	17.9	U	
BENZO(G,H,I)PERYLENE		25.8	J	P	2.51	J	P	17.9	U	
BENZO(K)FLUORANTHENE		15.8	J	P	3.63	U		17.9	U	
CHRYSENE		39.8			3.63	U		17.9	U	
DIBENZO(A,H)ANTHRACENE		17.2	U		3.63	U		17.9	U	
FLUORANTHENE		50.6			2.19	J	P	17.9	U	
FLUORENE		17.2	U		3.63	U		17.9	U	
INDENO(1,2,3-CD)PYRENE		24.6	J	P	3.63	U		17.9	U	
NAPHTHALENE		18.4	J	P	3.63	U		17.9	U	
PHENANTHRENE		34.5			2.1	J	P	17.9	U	
PYRENE		46.1			2.05	J	P	17.9	U	

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: PET MEDIA: SOIL	NSAMPLE	DSY-SB204-SO-0002			DSY-SB204-SO-0810			DSY-SB205-SO-0002			DSY-SB205-SO-088.5		
	LAB_ID	1102160-05			1102160-03			1102160-09			1102160-10		
	SAMP_DATE	2/14/2011			2/11/2011			2/15/2011			2/15/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	91.5			93.5			85.7			93.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIESEL RANGE ORGANICS		7.08	U		7.49			29.8			6.99	U	
GASOLINE RANGE ORGANICS		5.87	U		5.09	U		4.48	U		4.22	U	

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: PET MEDIA: SOIL	NSAMPLE	DSY-SB206-SO-0002			DSY-SB206-SO-0810			DSY-SB207-SO-0002			DSY-SB207-SO-1012		
	LAB_ID	1102160-06			1102160-07			1102160-11			1102160-12		
	SAMP_DATE	2/14/2011			2/14/2011			2/15/2011			2/15/2011		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	93.0			94.4			93.7			88.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIESEL RANGE ORGANICS		7.11	U		6.83	U		31.6			7.31	U	
GASOLINE RANGE ORGANICS		5.52	U		5.04	U		4.06	U		4.9	U	

PROJ_NO: 02125 SDG: CTOWE20_001 FRACTION: PET MEDIA: SOIL	NSAMPLE	DSY-SO-DUP01-021411			DSY-SO-TB01-021111		
	LAB_ID	1102160-08			1102160-04		
	SAMP_DATE	2/14/2011			2/11/2011		
	QC_TYPE	FD			TB		
	UNITS	MG/KG			MG/KG		
	PCT_SOLIDS	90.1					
	DUP_OF	DSY-SB204-SO-0002					
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIESEL RANGE ORGANICS		12.8					
GASOLINE RANGE ORGANICS		4.28	U		5	U	

APPENDIX F

SUPPORTING INFORMATION FOR HUMAN HEALTH RISK ASSESSMENT

APPENDIX F

SUPPORTING INFORMATION FOR HUMAN HEALTH RISK ASSESSMENT

- F.1 Samples Used in Risk Assessment**
- F.2 RAGS Part D Tables**
- F.3 ProUCL Outputs**
- F.4 Sample Calculations**
- F.5 Screening Risk Evaluation for Vapor Intrusion**
- F.6 RAGS Part D Tables for Chemicals Present
at Naturally Occurring Levels**

APPENDIX F.1

SAMPLES USED IN RISK ASSESSMENT

**TABLE 1
NORTH WATERFRONT**

SURFACE SOIL	SUBSURFACE SOIL		GROUNDWATER	SOIL GAS
Unpaved Areas	DSY-S-MW02-1820	DSY-S-TP16-1112	DSY-GW-MW02A-022411	DSY-SG-MW02A-0708
DSY-S-MW02-SS01	DSY-S-MW02-2426	DSY-S-TP18-0507	DSY-GW-MW03-022411	DSY-SG-MW03-0608
DSY-S-MW03-0_501	DSY-S-MW02-3436	DSY-S-TP18-1011	DSY-GW-MW11A-022611	DSY-SG-MW03-0608-D
DSY-S-MW04-SS01	DSY-S-MW03-0810	DSY-S-TP19-0507	DSY-GW-MW11A-022611-D	DSY-SG-MW11A-0203
DSY-S-MW11-0001	DSY-S-MW03-1618	DSY-S-TP19-1011	DSY-GW-MW12-030311	DSY-SG-MW12-0506
DSY-S-MW12-SS01	DSY-S-MW04-0810	DSY-S-TP20-0507	DSY-GW-MW204-031711	
DSY-SB-11-0002	DSY-S-MW04-1618	DSY-S-TP20-1011	DSY-GW-MW220-030111	
DSY-SB205-SO-0002	DSY-S-MW11-0103	DSY-S-TP21-0507	DSY-GW-MW221-030211	
DSY-SB207-SO-0002	DSY-S-MW11-1113	DSY-S-TP21-1011	DSY-GW-MW222-030211	
	DSY-S-MW11-1113-D	DSY-S-TP22-0506	DSY-GW-MW223-031611	
Paved Areas	DSY-S-MW11-2729	DSY-S-TP22-1112	DSY-A-MW02-01	
DSY-SB204-SO-0002	DSY-S-MW11-2931	DSY-S-TP23-0507	DSY-A-MW03-01	
DSY-SB204-SO-0002-D	DSY-S-MW11-2931-D	DSY-S-TP23-0910	DSY-A-MW03-01-D	
DSY-SB206-SO-0002	DSY-S-MW12-SS05	DSY-S-TP24-0102	DSY-A-MW04-01	
DSY-S-TP16-0001	DSY-S-MW12-SS12	DSY-S-TP24-0102-D	DSY-A-MW11-01	
DSY-S-TP18-0001	DSY-S-MW12-SS16	DSY-S-TP24-0507	DSY-A-MW12-01	
DSY-S-TP18-0001-D	DSY-SB204-SO-0810	DSY-S-TP24-1011		
DSY-S-TP19-0001	DSY-SB205-SO-088.5	DSY-S-TP27-0507		
DSY-S-TP20-0001	DSY-SB206-SO-0810	DSY-S-TP27-1011		
DSY-S-TP21-0001	DSY-SB207-SO-1012	DSY-S-TP28-0507		
DSY-S-TP22-0001	DSY-S-TP16-0506	DSY-S-TP28-1314		
DSY-S-TP23-0001				
DSY-S-TP27-0001				
DSY-S-TP28-0001				

All samples were used in the selection of chemicals of potential concern.

All soil samples were used to calculate exposure point concentrations for soil.

Samples used to calculate exposure point concentrations for groundwater are shaded.

**TABLE 2
CENTRAL SHIPYARD**

SURFACE SOIL	SUBSURFACE SOIL		GROUNDWATER
Unpaved Areas	DSY-S-MW04-3234	S42 SWN	DSY-A-MW05-01
DSY-S-MW07-0001	DSY-S-MW05-1012	S42 SWS	DSY-A-MW07-01
DSY-S-TP11-0001	DSY-S-MW05-2224	S42 SWW	DSY-GW-MW218-030111
	DSY-S-MW05-3234	DSY-SB-01-0911	DSY-GW-MW219-031611
Paved Areas	DSY-S-MW05-4446	DSY-SB-03-0911	DSY-GW-MW219-031611-D
DSY-S-MW05-SS01	DSY-S-MW07-0810	DSY-SB-09-1416	
DSY-S-MW05-SS01-D	DSY-S-MW07-1618	DSY-SB-10-1416	
DSY-S-TP12-0001	DSY-S-MW07-1618-D	DSY-SB-14-0103	
DSY-S-TP15-0001	DSY-S-MW07-2224	DSY-SB-14-0103-D	
DSY-S-TP17-0001	DSY-S-MW07-3436	DSY-SB-15-0103	
	N1-0	DSY-S-TP11-0507	
	N1-100	DSY-S-TP11-1213	
	N1-150	DSY-S-TP12-0507	
	N1-200	DSY-S-TP12-1213	
	N1-250	DSY-S-TP13-0506	
	N1-50	DSY-S-TP13-0506-D	
	N1-A	DSY-S-TP13-1011	
	N1-B	DSY-S-TP15-0506	
	N1-C	DSY-S-TP15-1112	
	N1-D	DSY-S-TP17-0507	
	N1-E	DSY-S-TP17-1112	
	S1	DSY-S-TP25-0507	
	S42 BOT	DSY-S-TP25-1011	
	S42 SWE	DPSOIL02	

All samples were used in the selection of chemicals of potential concern.

All soil samples were used to calculate exposure point concentrations for soil.

Samples used to calculate exposure point concentrations for groundwater are shaded.

TABLE 3
FORMER BUILDING 234 - SOIL SAMPLES

SURFACE SOIL	SUBSURFACE SOIL	GROUNDWATER
Unpaved Areas	DSY-S-MW08-0810	DSY-A-MW08-01
DSY-S-MW08-SS01	DSY-S-MW09-1012	DSY-A-MW08-01-D
DSY-S-MW09-0001	DSY-S-MW09-1012-D	DSY-A-MW09-01
MW09TP01	DSY-S-MW09-2022	DSY-A-MW104-01
DSY-S-TP07-0001	DSY-S-MW09-3032	DSY-GW-MW08-030111
DSY-S-TP09-0001	DSY-S-MW09-3638	
DSY-S-TP10-0001	DSY-SB-04-0406	
DSY-S-TP26-0001	DSY-SB-06-0204	
	DSY-S-TP08-0406	
Paved Areas	DSY-S-TP08-0910	
DSY-S-TP08-0001	DSY-S-TP09-0406	
DSY-S-TP08-0001-D	DSY-S-TP09-0910	
	DSY-S-TP10-0507	
	DSY-S-TP10-1213	
	DSY-S-TP26-0305	
	DSY-S-TP26-0406	
	DSY-S-TP26-0910	

All samples were used in the selection of chemicals of potential concern.

All soil samples were used to calculate exposure point concentrations for soil.

Samples used to calculate exposure point concentrations for groundwater are shaded.

TABLE 4
SOUTH WATERFRONT - SOIL SAMPLES

SUBSURFACE SOIL
DSY-SB201-SO-0204
DSY-SB202-SO-0204
DSY-S-TP01-1112
DSY-S-TP02-1516
DSY-S-TP05-1213
DSY-S-TP06-1213

All samples were used in the selection of chemicals of potential concern.
All soil samples were used to calculate exposure point concentrations for soil.

TABLE 5
PCB REMOVAL AREA - SOIL SAMPLES

SURFACE SOIL	SUBSURFACE SOIL
Unpaved Areas	DSY-S-MW06-0406
DSY-S-MW06-SS01	DSY-SO-SB210-0102
DSY-SO-SB208-000.5	DSY-SO-SB211-0102
DSY-SO-SB208-000.5-D	DSY-SO-SB212-0204
DSY-SO-SB215-000.5	DSY-SO-SB213-0203
DSY-SO-SB216-000.5	DSY-SO-SB214-0203
DSY-SO-SB217-000.5	B6-S6
DSY-SO-SB224-000.5	
DSY-SO-SB224-000.5-D	
Paved Areas	
DSY-SO-SB209-0.30.7	
B6-S1	

All samples were used in the selection of chemicals of potential concern.

All soil samples were used to calculate exposure point concentrations for soil.

APPENDIX F.2

RAGS-PART D TABLES

RAGS Part D Table 1
Selection of Exposure Pathways

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 4

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Surface Soil	Surface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Industrial workers may contact surface soil during normal work activities.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	Quant Quant	Trespassers may contact surface soil while at the site.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	Quant	Industrial workers may be exposed to fugitive dust and volatile emissions during work activities.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Trespassers	Adolescents	Inhalation	Quant	Trespassers may be exposed to fugitive dust and volatile emissions while at the site.
					Adult	Inhalation	Quant	
		Subsurface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	None None	Current industrial workers are not exposed to subsurface soil.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	None None	Current trespassers are not exposed to subsurface soil.
					Adult	Ingestion Dermal	None None	
			Derecktor Shipyard	Industrial Worker	Adult	Inhalation	None	Current industrial workers are not exposed to subsurface soil.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trespassers	Adolescents	Inhalation	None	Current trespassers are not exposed to subsurface soil.
					Adult	Inhalation	None	
	Groundwater	Groundwater	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	None None	Current industrial workers are not exposed to groundwater.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with ground water during excavation activities.
				Trespassers Users	Adolescents	Ingestion Dermal	None None	Current trespassers are not exposed to groundwater.
					Adult	Ingestion Dermal	None None	

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 4

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	None	Current industrial workers are not exposed to groundwater.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Trespassers	Adolescents	Inhalation	None	Current trespassers are not exposed to groundwater.
					Adult	Inhalation	None	
			Vapor Intrusion	Industrial Worker	Adult	Inhalation	None	At present there are no buildings on the site.
Future	Surface Soil	Surface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Industrial workers may contact surface soil during normal work activities.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Trespassers	Adolescents	Ingestion Dermal	Quant Quant	Trespassers may contact surface soil while at the site.
					Adult	Ingestion Dermal	Quant Quant	
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	Quant	Industrial workers may be exposed to fugitive dust and volatile emissions during work activities.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Trespassers	Adolescents	Inhalation	Quant	Trespassers may be exposed to fugitive dust and volatile emissions while at the site.
					Adult	Inhalation	Quant	
				Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
	Subsurface Soil	Subsurface Soil	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by industrial workers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
				Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Subsurface Soil	Subsurface Soil	Derecktor Shipyard	Trespassers	Adolescents	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by trespassers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	Quant	Although exposures to subsurface soil by industrial workers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trespassers	Adolescents	Inhalation	Quant	Although exposures to subsurface soil by trespassers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
				Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
Future	Groundwater	Groundwater	Derecktor Shipyard	Industrial Worker	Adult	Ingestion Dermal	Quant Quant	Future industrial workers may be exposed to groundwater if groundwater was used as a water supply.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Trespassers Users	Adolescents	Ingestion Dermal	None None	Future trespassers are not expected to be exposed to groundwater.
					Adult	Ingestion Dermal	None None	
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Derecktor Shipyard	Industrial Worker	Adult	Inhalation	None	Future industrial workers are not exposed to be exposed to COPCs that have volatilized from groundwater.
				Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Trespassers	Adolescents	Inhalation	None	Future trespassers are not expected to be exposed to groundwater.
					Adult	Inhalation	None	

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Air	Derecktor Shipyards	Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
			Vapor Intrusion	Industrial Worker	Adult	Inhalation	Qual	Future industrial workers could be exposed to COPCs that have volatilized from groundwater and migrated through building foundations and into indoor air.
				Residents	Child	Inhalation	Qual	Hypothetical residents could be exposed to COPCs that have volatilized from groundwater and migrated through building foundations and into indoor air.
					Adult	Inhalation	Qual	

Notes:

Qual - Qualitative.

Quant - Quantitative.

RAGS Part D Table 2
Occurrence, Distribution and Selection
Of Chemicals of Potential Concern

LIST OF TABLES
RAGS PART D TABLE 2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Table No.

2.1	Surface Soil - Direct Contact - North Waterfront
2.2	Subsurface Soil - Direct Contact - North Waterfront
2.3	Groundwater - Direct Contact - North Waterfront
2.4	Groundwater - Vapor Intrusion - North Waterfront
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TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁴⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
North Waterfront	Volatile Organic Compounds													
	78-93-3	2-Butanone	3.01 J	3.26 J	ug/kg	DSY-SB204-SO-0002-D	1/19	3.92 - 12	3.26	NA	2,800,000 N	10,000,000	No	BSL
	591-78-6	2-Hexanone	3.17 J	4.96 J	ug/kg	DSY-SB204-SO-0002-D	1/19	1.96 - 12	4.96	NA	21,000 N	NA	No	BSL
	67-64-1	Acetone	9.96 J	120	ug/kg	DSY-S-TP18-0001-D	10/19	10 - 41	120	NA	6,100,000 N	7,800,000	No	BSL
	71-43-2	Benzene	1 J	1 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	1	NA	1,100 C	2,500	No	BSL
	75-15-0	Carbon Disulfide	3.28 J	3.28 J	ug/kg	DSY-SB205-SO-0002	1/19	1.96 - 12	3.28	NA	82,000 N	NA	No	BSL
	108-90-7	Chlorobenzene	3 J	3 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	3	NA	29,000 N	210,000	No	BSL
	108-88-3	Toluene	1 J	4 J	ug/kg	DSY-S-TP23-0001	6/19	1.96 - 11	4	NA	500,000 N	190,000	No	BSL
	1330-20-7	Total Xylenes	1 J	2 J	ug/kg	DSY-S-TP23-0001	2/19	5.88 - 12	2	NA	63,000 N	110,000	No	BSL
	79-01-6	Trichloroethene	2 J	2 J	ug/kg	DSY-S-TP16-0001	1/19	1.96 - 11	2	NA	440 N ⁽⁸⁾	13,000	No	BSL
North Waterfront	Semivolatile Organic Compounds													
	108-60-1	2,2'-Oxybis(1-Chloropropane)	39 J	39 J	ug/kg	DSY-S-TP18-0001-D	1/15	330 - 12000	39	NA	4,600 C	NA	No	BSL
	91-57-6	2-Methylnaphthalene	14.5 J	14.5 J	ug/kg	DSY-SB207-SO-0002	1/19	3.56 - 12000	14.5	NA	23,000 N	123,000	No	BSL
	83-32-9	Acenaphthene	17.8 J	17.8 J	ug/kg	DSY-SB205-SO-0002	2/19	3.56 - 12000	17.8	NA	340,000 N	43,000	No	BSL
	208-96-8	Acenaphthylene	19.9 J	19.9 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	19.9	NA	340,000 N ⁽⁹⁾	23,000	No	BSL
	120-12-7	Anthracene	51.1	51.1	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	51.1	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	15.7 J	710 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	710	NA	150 C	900	Yes	ASL
	50-32-8	Benzo(a)pyrene	11.7 J	680 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	680	NA	15 C	400	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	15.5 J	1,000 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,000	NA	150 C	900	Yes	ASL
	191-24-2	Benzo(g,h,i)perylene	1.92 J	119	ug/kg	DSY-SB205-SO-0002	4/19	17.9 - 12000	119	NA	170,000 N ⁽¹⁰⁾	800	No	BSL
	207-08-9	Benzo(k)fluoranthene	15.8 J	92.4	ug/kg	DSY-SB205-SO-0002	3/19	3.56 - 12000	92.4	NA	1,500 C	900	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	44 J	150 J	ug/kg	DSY-S-TP18-0001	8/15	330 - 12000	150	NA	35,000 C	46,000	No	BSL
	218-01-9	Chrysene	16.5 J	690 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	690	NA	15,000 C	400	Yes	ASL
	53-70-3	Dibenzo(a,h)anthracene	124	124	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	124	NA	15 C	400	Yes	ASL
	206-44-0	Fluoranthene	20 J	1,400 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	1,400	NA	230,000 N	20,000	No	BSL
	86-73-7	Fluorene	21.7 J	21.7 J	ug/kg	DSY-SB205-SO-0002	1/19	3.56 - 12000	21.7	NA	230,000 N	28,000	No	BSL
	67-72-1	Hexachloroethane	55 J	55 J	ug/kg	DSY-S-TP20-0001	1/15	330 - 12000	55	NA	4,300 N ⁽⁸⁾	46,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	12 J	520 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	520	NA	150 C	900	Yes	ASL
	91-20-3	Naphthalene	18.4 J	18.4 J	ug/kg	DSY-SB207-SO-0002	1/19	3.56 - 12000	18.4	NA	3,600 C	54,000	No	BSL
	85-01-8	Phenanthrene	11.3 J	730 J	ug/kg	DSY-S-TP28-0001	4/19	3.56 - 12000	730	NA	170,000 N ⁽¹⁰⁾	40,000	No	BSL
	108-95-2	Phenol	170 J	170 J	ug/kg	DSY-S-TP18-0001	1/15	330 - 12000	170	NA	1,800,000 N	6,000,000	No	BSL
	129-00-0	Pyrene	3.05 J	1,400 J	ug/kg	DSY-S-TP16-0001	6/19	17.9 - 410	1,400	NA	170,000 N	13,000	No	BSL
North Waterfront	Pesticides/PCBs													
	72-55-9	4,4'-DDE	22	22	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	22	NA	1,400 C	NA	No	BSL
	50-29-3	4,4'-DDT	56	56	ug/kg	DSY-S-TP28-0001	1/15	3.2 - 4.1	56	NA	1,700 C	NA	No	BSL
	5103-71-9	alpha-Chlordane	2	7.3	ug/kg	DSY-S-TP28-0001	2/15	1.7 - 2.1	7.3	NA	1,600 C ⁽¹¹⁾	NA	No	BSL
	11096-82-5	Aroclor-1260	24 J	24 J	ug/kg	DSY-S-TP16-0001	1/15	32 - 41	24	NA	220 C	NA	No	BSL
	60-57-1	Dieldrin	16	16	ug/kg	DSY-S-TP16-0001	1/15	3.2 - 4.1	16	NA	30 C	40	No	BSL
	72-20-8	Endrin	5.7	26	ug/kg	DSY-S-TP16-0001	2/15	3.2 - 3.6	26	NA	1,800 N	NA	No	BSL
	5103-74-2	gamma-Chlordane	2.4	2.4	ug/kg	DSY-S-MW03-0_501	2/15	1.7 - 2.1	2.4	NA	1,600 C ⁽¹¹⁾	NA	No	BSL
	1024-57-3	Heptachlor Epoxide	4.2	4.2	ug/kg	DSY-S-TP28-0001	1/15	1.7 - 2.1	4.2	NA	53 C	NA	No	BSL
North Waterfront	Metals													
	7429-90-5	Aluminum	3,440 J	9,650	mg/kg	DSY-SB205-SO-0002	19/19	-	9,650	16,020	7,700 N	NA	No	BKG
	7440-38-2	Arsenic	2.41	10.9 J	mg/kg	DSY-S-TP28-0001	17/19	2.9 - 3.3	10.9	13	0.39 C	7	No	BKG
	7440-39-3	Barium	5.1	49.4	mg/kg	DSY-S-TP16-0001	18/19	4.1 - 4.1	49.4	51	1,500 N	5,500	No	BSL, BKG
	7440-41-7	Beryllium	0.18 J	1.1	mg/kg	DSY-S-TP16-0001	10/19	0.15 - 0.21	1.1	0.58	16 N	1.5	No	BSL
	7440-43-9	Cadmium	0.85 J	0.85 J	mg/kg	DSY-S-TP16-0001	1/19	0.109 - 0.64	0.85	0.17	7 N	39	No	BSL
	7440-70-2	Calcium	237	2,290	mg/kg	DSY-SB205-SO-0002	18/19	91.1 - 91.1	2,290	1,598	NA	NA	No	NUT
	7440-47-3	Chromium	5.2	24.1	mg/kg	DSY-S-TP16-0001	17/19	6.5 - 6.9	24.1	16	0.29 C ⁽¹²⁾	390 ⁽¹²⁾	Yes	ASL
	7440-48-4	Cobalt	2.6	14.7	mg/kg	DSY-S-TP16-0001	17/19	3.5 - 4.6	14.7	9	2.3 N	NA	Yes	ASL
	7440-50-8	Copper	3.1	111	mg/kg	DSY-S-TP16-0001	19/19	-	111	12	310 N	3,100	No	BSL
	7439-89-6	Iron	11,200 J	27,100	mg/kg	DSY-SB205-SO-0002	19/19	-	27,100	24,200	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	2.3 J	115 J	mg/kg	DSY-S-TP28-0001	19/19	-	115	40	400	150	No	BSL
	7439-95-4	Magnesium	1,320	2,680	mg/kg	DSY-SB205-SO-0002	19/19	-	2,680	2,571	NA	NA	No	NUT
	7439-96-5	Manganese	81.4 J	340 J	mg/kg	DSY-S-TP23-0001	19/19	-	340	349	180 N	390	No	BKG
	7439-97-6	Mercury	0.0204 J	0.06	mg/kg	DSY-S-MW03-0_501	4/19	0.0292 - 0.17	0.06	0.18	2.3 N ⁽¹³⁾	23	No	BSL, BKG
	7440-02-0	Nickel	8.2 J	68.5	mg/kg	DSY-S-TP16-0001	13/19	9.3 - 14.4	68.5	15	150 N	1,000	No	BSL
Metals (Continued)														

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
	7440-09-7	Potassium	198	639 J	mg/kg	DSY-SB206-SO-0002	19/19	-	639	651	NA	NA	No	NUT, BKG
	7782-49-2	Selenium	0.63 J	1 J	mg/kg	DSY-S-MW12-SS01	6/17	0.273 - 0.85	1	0.57	39 N	390	No	BSL
	7440-23-5	Sodium	19.7 J	172	mg/kg	DSY-S-TP16-0001	7/19	11.7 - 343	172	231	NA	NA	No	NUT, BKG
	7440-62-2	Vanadium	6.4	39	mg/kg	DSY-S-TP28-0001	19/19	-	39	34	39 N	550	No	BSL
	7440-66-6	Zinc	22.8	883	mg/kg	DSY-S-TP16-0001	19/19	-	883	62	2,300 N	6,000	No	BSL
	Miscellaneous Parameters													
	1002-53-5	Dibutyltin	5.2 J	33	ug/kg	DSY-S-TP16-0001	2/15	49 - 50	33	NA	1,800 N	NA	No	BSL
	78763-54-9	Monobutyltin	33	33	ug/kg	DSY-S-TP16-0001	1/15	49 - 50	33	NA	1,800 N ⁽¹⁴⁾	NA	No	BSL
	1461-25-2	Tetrabutyltin	2.5 J	5.8 J	ug/kg	DSY-S-TP22-0001	4/15	49 - 50	5.8	NA	1,800 N ⁽¹⁴⁾	NA	No	BSL
	56573-85-4	Tributyltin	3.6 J	30 J	ug/kg	DSY-S-TP16-0001	3/15	49 - 50	30	NA	1,800 N	NA	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 - Value is for acenaphthene.
- 10 - Value is for pyrene.
- 11 - Value is for chlordane.
- 12 - Value is for hexavalent chromium.
- 13 - Value is for mercuric chloride (and other mercury salts).
- 14 - Value is for dibutyltin and tributyltin.

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-S-MW02-SS01
DSY-S-MW03-0_501
DSY-S-MW04-SS01
DSY-S-MW11-0001
DSY-S-MW12-SS01
DSY-SB-11-0002
DSY-SB204-SO-0002
DSY-SB204-SO-0002-D
DSY-SB205-SO-0002
DSY-SB206-SO-0002
DSY-SB207-SO-0002
DSY-S-TP16-0001
DSY-S-TP18-0001
DSY-S-TP18-0001-D
DSY-S-TP19-0001
DSY-S-TP20-0001
DSY-S-TP21-0001
DSY-S-TP22-0001
DSY-S-TP23-0001
DSY-S-TP27-0001
DSY-S-TP28-0001

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
North Waterfront	Volatile Organic Compounds													
	78-93-3	2-Butanone	14	14	ug/kg	DSY-S-TP24-0102	1/21	4.32 - 110	14	NA	2,800,000 N	10,000,000	No	BSL
	67-64-1	Acetone	16	240	ug/kg	DSY-S-MW11-2931	3/21	8.63 - 270	240	NA	6,100,000 N	7,800,000	No	BSL
	75-15-0	Carbon Disulfide	2 J	2.6 J	ug/kg	DSY-SB205-SO-088.5	2/21	2.16 - 110	2.6	NA	82,000 N	NA	No	BSL
	108-88-3	Toluene	2 J	2 J	ug/kg	DSY-S-TP24-0102	1/21	2.16 - 110	2	NA	500,000 N	190,000	No	BSL
	540-59-0	Total 1,2-Dichloroethene	1 J	5 J	ug/kg	DSY-S-MW11-2931-D	1/21	2.16 - 110	5	NA	70,000 N	630,000	No	BSL
	1330-20-7	Total Xylenes	2 J	2 J	ug/kg	DSY-S-MW11-0103, DSY-S-TP24-0102	2/21	6.47 - 110	2	NA	63,000 N	110,000	No	BSL
	79-01-6	Trichloroethene	1 J	4 J	ug/kg	DSY-S-MW11-2931, DSY-S-MW11-2931-D	4/21	2.16 - 110	4	NA	440 N ⁽⁸⁾	13,000	No	BSL
	Semivolatile Organic Compounds													
	83-32-9	Acenaphthene	3.62 J	3.62 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.62	NA	340,000 N	43,000	No	BSL
	208-96-8	Acenaphthylene	3.53 J	3.53 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.53	NA	340,000 N ⁽⁹⁾	23,000	No	BSL
	120-12-7	Anthracene	8	8	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	8	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	27 J	53 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	53	NA	150 C	900	No	BSL
	50-32-8	Benzo(a)pyrene	23.3	44 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA	15 C	400	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	2.65 J	71 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	71	NA	150 C	900	No	BSL
	191-24-2	Benzo(g,h,i)perylene	2.51 J	21.6	ug/kg	DSY-SB205-SO-088.5	2/21	3.42 - 11000	21.6	NA	170,000 N ⁽¹⁰⁾	800	No	BSL
	207-08-9	Benzo(k)fluoranthene	11.2	11.2	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	11.2	NA	1,500 C	900	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	43 J	97 J	ug/kg	DSY-S-TP24-0102	5/17	330 - 11000	97	NA	35,000 C	46,000	No	BSL
	218-01-9	Chrysene	32.1	44 J	ug/kg	DSY-S-TP24-0102-D	2/21	3.42 - 11000	44	NA	15,000 C	400	No	BSL
	53-70-3	Dibenzo(a,h)anthracene	23.3	23.3	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	23.3	NA	15 C	400	Yes	ASL
	84-74-2	di-n-Butyl Phthalate	42 J	270 J	ug/kg	DSY-S-MW04-1618	3/17	330 - 11000	270	NA	610,000 N	NA	No	BSL
	206-44-0	Fluoranthene	2.19 J	81 J	ug/kg	DSY-S-TP24-0102-D	4/21	3.42 - 11000	81	NA	230,000 N	20,000	No	BSL
	86-73-7	Fluorene	2.93 J	2.93 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	2.93	NA	230,000 N	28,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	18	18	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	18	NA	150 C	900	No	BSL
	91-20-3	Naphthalene	3.54 J	3.54 J	ug/kg	DSY-SB205-SO-088.5	1/21	3.42 - 11000	3.54	NA	3,600 C	54,000	No	BSL
	85-01-8	Phenanthrene	2.1 J	54 J	ug/kg	DSY-S-TP24-0102-D	3/21	3.42 - 11000	54	NA	170,000 N ⁽¹⁰⁾	40,000	No	BSL
	129-00-0	Pyrene	2.05 J	1,600 J	ug/kg	DSY-S-TP16-1112	4/21	3.42 - 420	1,600	NA	170,000 N	13,000	No	BSL
	Pesticides/PCBs													
	309-00-2	Aldrin	4.4 J	4.4 J	ug/kg	DSY-S-TP16-1112	1/17	1.7 - 2.2	4.4	NA	29 C	NA	No	BSL
	5103-71-9	alpha-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA	1,600 C ⁽¹¹⁾	NA	No	BSL
	72-20-8	Endrin	15	15	ug/kg	DSY-S-TP16-1112	1/15	3.4 - 3.9	15	NA	1,800 N	NA	No	BSL
	5103-74-2	gamma-Chlordane	2.1	2.1	ug/kg	DSY-S-MW03-0810	1/15	1.7 - 2	2.1	NA	1,600 C ⁽¹¹⁾	NA	No	BSL
	76-44-8	Heptachlor	2.4	3.8	ug/kg	DSY-S-MW02-2426	4/17	1.7 - 2.2	3.8	NA	110 C	NA	No	BSL
	Metals													
	7429-90-5	Aluminum	2,430 J	18,200	mg/kg	DSY-S-MW02-3436	39/39	-	18,200	13075	7,700 N	NA	Yes	ASL
	7440-38-2	Arsenic	2.7 J	16.6	mg/kg	DSY-S-TP16-1112	37/39	4.1 - 4.7	16.6	20	0.39 C	7	No	BKG
	7440-39-3	Barium	3.2	26.2 J	mg/kg	DSY-S-TP28-1314	26/39	2.1 - 6	26.2	36	1,500 N	5,500	No	BSL, BKG
	7440-41-7	Beryllium	0.176 J	0.35 J	mg/kg	DSY-S-TP22-1112, DSY-S-TP28-0507, DSY-S-TP28-1314	22/39	0.18 - 0.26	0.35	0.64	16 N	1.5	No	BSL, BKG
	7440-43-9	Cadmium	0.65 J	0.65 J	mg/kg	DSY-S-TP22-1112	1/39	0.106 - 1.1	0.65	0.23	7 N	39	No	BSL
	7440-70-2	Calcium	305	3,480	mg/kg	DSY-S-MW02-1820	39/39	-	3,480	1689	NA	NA	No	NUT
	7440-47-3	Chromium	2.2 J	27.1 J	mg/kg	DSY-S-MW02-3436	37/39	6 - 7.8	27.1	18	0.29 C ⁽¹²⁾	390 ⁽¹²⁾	Yes	ASL
	7440-48-4	Cobalt	3 J	19.8	mg/kg	DSY-S-MW02-3436	33/39	2.6 - 3.2	19.8	17	2.3 N	NA	Yes	ASL
	7440-50-8	Copper	4.1 J	30.9	mg/kg	DSY-S-MW02-3436	36/39	4.1 - 5	30.9	24	310 N	3,100	No	BSL
	7439-89-6	Iron	6,970	44,400 J	mg/kg	DSY-S-MW11-2931	39/39	-	44,400	39173	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	1.6 J	29.2	mg/kg	DSY-S-MW03-1618	38/39	1.7 - 1.7	29.2	12	400	150	No	BSL
	7439-95-4	Magnesium	921	7,680	mg/kg	DSY-S-MW02-3436	39/39	-	7,680	3811	NA	NA	No	NUT
	7439-96-5	Manganese	55.4	549 J	mg/kg	DSY-S-TP22-1112	39/39	-	549	1037	180 N ⁽¹³⁾	390	No	BKG
	7439-97-6	Mercury	0.0125 J	0.31	mg/kg	DSY-S-MW11-2931	4/39	0.03 - 0.18	0.31	0.012	2.3 N ⁽¹³⁾	23	No	BSL
	7440-02-0	Nickel	5.1	39.5	mg/kg	DSY-S-MW02-3436	37/39	14.1 - 15.7	39.5	28	150 N	1,000	No	BSL
	7440-09-7	Potassium	132	1,190	mg/kg	DSY-S-MW12-SS12	39/39	-	1,190	1700	NA	NA	No	NUT, BKG
	7782-49-2	Selenium	0.16 J	1.3 J	mg/kg	DSY-S-MW12-SS16	9/36	0.269 - 1	1.3	0.29	39 N	390	No	BSL

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
	Metals (Continued)													
	7440-23-5	Sodium	23	117	mg/kg	DSY-S-TP20-1011	3/38	16.8 - 330	117	83	NA	NA	No	NUT
	7440-62-2	Vanadium	4.3	23.9 J	mg/kg	DSY-S-MW11-2931	39/39	-	23.9	23	39 N	550	No	BSL
	7440-66-6	Zinc	13.6 J	74.9	mg/kg	DSY-S-MW11-2931	39/39	-	74.9	66	2,300 N	6,000	No	BSL
	Miscellaneous Parameters													
	1461-25-2	Tetrabutyltin	3.3 J	8.5 J	ug/kg	DSY-S-TP24-0102-D	3/17	49 - 50	8.5	NA	1,800 N ⁽¹⁴⁾	NA	No	BSL
	56573-85-4	Tributyltin	1.4 J	15.1 J	ug/kg	DSY-S-MW11-2931	5/17	49 - 50	15.1	NA	1,800 N	NA	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 - Value is for acenaphthene.
- 10 - Value is for pyrene.
- 11 - Value is for chlordane.
- 12 - Value is for hexavalent chromium.
- 13 - Value is for mercuric chloride (and other mercury salts).
- 14 - Value is for dibutyltin and tributyltin.

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-S-MW02-1820	DSY-S-TP16-1112
DSY-S-MW02-2426	DSY-S-TP18-0507
DSY-S-MW02-3436	DSY-S-TP18-1011
DSY-S-MW03-0810	DSY-S-TP19-0507
DSY-S-MW03-1618	DSY-S-TP19-1011
DSY-S-MW04-0810	DSY-S-TP20-0507
DSY-S-MW04-1618	DSY-S-TP20-1011
DSY-S-MW11-0103	DSY-S-TP21-0507
DSY-S-MW11-1113	DSY-S-TP21-1011
DSY-S-MW11-1113-D	DSY-S-TP22-0506
DSY-S-MW11-2729	DSY-S-TP22-1112
DSY-S-MW11-2931	DSY-S-TP23-0507
DSY-S-MW11-2931-D	DSY-S-TP23-0910
DSY-S-MW12-SS05	DSY-S-TP24-0102
DSY-S-MW12-SS12	DSY-S-TP24-0102-D
DSY-S-MW12-SS16	DSY-S-TP24-0507
DSY-SB204-SO-0810	DSY-S-TP24-1011
DSY-SB205-SO-088.5	DSY-S-TP27-0507
DSY-SB206-SO-0810	DSY-S-TP27-1011
DSY-SB207-SO-1012	DSY-S-TP28-0507
DSY-S-TP16-0506	DSY-S-TP28-1314

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
North Waterfront	Volatile Organic Compounds														
	67-64-1	Acetone	10 J	10 J	ug/L	DSY-A-MW03-01	1/14	5 - 40	10	NA	1,200 N	NA	NA	No	BSL
	156-59-2	cis-1,2-Dichloroethene	0.284 J	4.26	ug/L	DSY-GW-MW220-030111	5/9	0.5 - 0.5	4.26	NA	2.8 N	70	EPA-MCL RIDE M	Yes	ASL
	127-18-4	Tetrachloroethene	0.696 J	0.696 J	ug/L	DSY-GW-MW03-022411	1/14	0.5 - 10	0.696	NA	3.5 N ⁽⁷⁾	5	EPA-MCL RIDE M	No	BSL
	156-60-5	trans-1,2-Dichloroethene	0.669 J	4.81	ug/L	DSY-GW-MW12-030311	3/9	0.5 - 0.5	4.81	NA	8.6 N	100	EPA-MCL RIDE M	No	BSL
	79-01-6	Trichloroethene	3.16	33	ug/L	DSY-A-MW03-01-D	8/14	0.5 - 10	33	NA	0.26 N ⁽⁷⁾	5	EPA-MCL RIDE M	Yes	ASL
	75-01-4	Vinyl Chloride	1.47	1.47	ug/L	DSY-GW-MW220-030111	1/14	0.5 - 10	1.47	NA	0.015 C	2	EPA-MCL RIDE M	Yes	ASL
	Metals (Total)														
	7429-90-5	Aluminum	337	337	ug/L	DSY-GW-MW204-031711	1/6	43.9 - 227	337	NA	1,600 N	50 - 200	EPA-SDWR	Yes	ASL
	7440-38-2	Arsenic	4.3 J	13.2	ug/L	DSY-A-MW11-01	3/6	1.5 - 4	13.2	NA	0.045 C	10	EPA-MCL RIDE M	Yes	ASL
	7440-39-3	Barium	11.6	44.4	ug/L	DSY-A-MW02-01	3/6	10.4 - 33.5	44.4	NA	290 N	2,000	EPA-MCL RIDE M	No	BSL
	7440-70-2	Calcium	22,000 J	80,200	ug/L	DSY-A-MW04-01	6/6	-	80,200	NA	NA	NA	NA	No	NUT
	7440-47-3	Chromium	0.508 J	7.3 J	ug/L	DSY-A-MW11-01	2/6	6 - 6	7.3	NA	0.031 C	100	EPA-MCL RIDE M	Yes	ASL
	7440-50-8	Copper	5.4 J	5.8 J	ug/L	DSY-A-MW03-01-D	1/6	2 - 5	5.8	NA	62 N	1,300	EPA-SDWR	No	BSL
	7439-89-6	Iron	78.3 J	605 J	ug/L	DSY-GW-MW204-031711	3/6	134 - 216	605	NA	1,100 N	300	EPA-SDWR	Yes	ASL
	7439-95-4	Magnesium	6,700 J	31,600	ug/L	DSY-A-MW02-01	6/6	-	31,600	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	30	373	ug/L	DSY-A-MW11-01	6/6	19.9 - 19.9	373	NA	32 N	50	EPA-SDWR	Yes	ASL
	7440-02-0	Nickel	3.38	11.4 J	ug/L	DSY-A-MW03-01-D	2/6	9 - 9	11.4	NA	30 N	NA	NA	No	BSL
	7440-09-7	Potassium	1,660	17,100	ug/L	DSY-A-MW02-01	6/6	-	17,100	NA	NA	NA	NA	No	NUT
	7440-23-5	Sodium	29,700	200,000	ug/L	DSY-A-MW02-01	6/6	-	200,000	NA	NA	NA	NA	No	NUT
	7440-66-6	Zinc	6.65	68.3	ug/L	DSY-A-MW02-01	4/6	15.2 - 17.3	68.3	NA	470 N	5,000	EPA-SDWR	No	BSL
	7429-90-5	Aluminum	72	72	ug/L	DSY-GW-MW204-031711	1/1	-	72	NA	1,600 N	50 - 200	EPA-SDWR	Yes	ASL
	7440-39-3	Barium	11.5	11.5	ug/L	DSY-GW-MW204-031711	1/1	-	11.5	NA	290 N	2,000	EPA-MCL RIDE M	No	BSL
	Dissolved Metals (Continued)														
	7440-70-2	Calcium	30,800 J	30,800 J	ug/L	DSY-GW-MW204-031711	1/1	-	30,800	NA	NA	NA	NA	No	NUT
	7440-50-8	Copper	1.19 J	1.19 J	ug/L	DSY-GW-MW204-031711	1/1	-	1.19	NA	62 N	1,300	EPA-SDWR	No	BSL
	7439-89-6	Iron	50.5 J	50.5 J	ug/L	DSY-GW-MW204-031711	1/1	-	50.5	NA	1,100 N	300	EPA-SDWR	No	BSL
	7439-95-4	Magnesium	7,450 J	7,450 J	ug/L	DSY-GW-MW204-031711	1/1	-	7,450	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	53.3	53.3	ug/L	DSY-GW-MW204-031711	1/1	-	53.3	NA	32 N	50	EPA-SDWR	Yes	ASL
	7440-02-0	Nickel	3.39	3.39	ug/L	DSY-GW-MW204-031711	1/1	-	3.39	NA	30 N	NA	NA	No	BSL

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
	Metals (Dissolved)														
	7440-09-7	Potassium	1,770	1,770	ug/L	DSY-GW-MW204-031711	1/1	-	1,770	NA	NA	NA	NA	No	NUT
	7440-23-5	Sodium	42,300	42,300	ug/L	DSY-GW-MW204-031711	1/1	-	42,300	NA	NA	NA	NA	No	NUT
	7440-66-6	Zinc	6.48	6.48	ug/L	DSY-GW-MW204-031711	1/1	-	6.48	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
 - 2 - Values presented are sample-specific quantitation limits.
 - 3 - The maximum detected concentration is used for screening purposes.
 - 4 - No background data is available for groundwater.
 - 5 - USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
 - 6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
 - 7 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-GW-MW02A-022411
DSY-GW-MW03-022411
DSY-GW-MW11A-022611
DSY-GW-MW11A-022611-D
DSY-GW-MW12-030311
DSY-GW-MW204-031711
DSY-GW-MW220-030111
DSY-GW-MW221-030211
DSY-GW-MW222-030211
DSY-GW-MW223-031611
DSY-A-MW02-01
DSY-A-MW03-01
DSY-A-MW03-01-D
DSY-A-MW04-01
DSY-A-MW11-01
DSY-A-MW12-01

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)
EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
RIDEM = Rhode Island Department of Environmental Management GA Groundwater Objective (November, 2011).

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Vapor Intrusion Criteria ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
North Waterfront	Volatile Organic Compounds														
	67-64-1	Acetone	10 J	10 J	ug/L	DSY-A-MW03-01	1/14	5 - 40	10	NA	2,300,000 N	NA	NA	No	BSL
	156-59-2	cis-1,2-Dichloroethene	0.284 J	4.26	ug/L	DSY-GW-MW220-030111	5/9	0.5 - 0.5	4.26	NA	NA	NA	NA	No	NTX
	127-18-4	Tetrachloroethene	0.696 J	0.696 J	ug/L	DSY-GW-MW03-022411	1/14	0.5 - 10	0.696	NA	5.8 N ⁽⁷⁾	NA	NA	No	BSL
	156-60-5	trans-1,2-Dichloroethene	0.669 J	4.81	ug/L	DSY-GW-MW12-030311	3/9	0.5 - 0.5	4.81	NA	38 N	NA	NA	No	BSL
	79-01-6	Trichloroethene	3.16	33	ug/L	DSY-A-MW03-01-D	8/14	0.5 - 10	33	NA	0.52 N ⁽⁷⁾	NA	NA	Yes	ASL
	75-01-4	Vinyl Chloride	1.47	1.47	ug/L	DSY-GW-MW220-030111	1/14	0.5 - 10	1.47	NA	0.14 C	NA	NA	Yes	ASL
	Metals														
	7429-90-5	Aluminum	337	337	ug/L	DSY-GW-MW204-031711	1/6	43.9 - 227	337	NA	NA	NA	NA	No	NTX
	7440-38-2	Arsenic	4.3 J	13.2	ug/L	DSY-A-MW11-01	3/6	1.5 - 4	13.2	NA	NA	NA	NA	No	NTX
	7440-39-3	Barium	11.6	44.4	ug/L	DSY-A-MW02-01	3/6	10.4 - 33.5	44.4	NA	NA	NA	NA	No	NTX
	7440-70-2	Calcium	22,000 J	80,200	ug/L	DSY-A-MW04-01	6/6	-	80,200	NA	NA	NA	NA	No	NUT
	7440-47-3	Chromium	0.508 J	7.3 J	ug/L	DSY-A-MW11-01	2/6	6 - 6	7.3	NA	NA	NA	NA	No	NTX
	7440-50-8	Copper	5.4 J	5.8 J	ug/L	DSY-A-MW03-01-D	1/6	2 - 5	5.8	NA	NA	NA	NA	No	NTX
	7439-89-6	Iron	78.3 J	605 J	ug/L	DSY-GW-MW204-031711	3/6	134 - 216	605	NA	NA	NA	NA	No	NTX
	7439-95-4	Magnesium	6,700 J	31,600	ug/L	DSY-A-MW02-01	6/6	-	31,600	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	30	373	ug/L	DSY-A-MW11-01	6/6	19.9 - 19.9	373	NA	NA	NA	NA	No	NTX
	7440-02-0	Nickel	3.38	11.4 J	ug/L	DSY-A-MW03-01-D	2/6	9 - 9	11.4	NA	NA	NA	NA	No	NTX
	7440-09-7	Potassium	1,660	17,100	ug/L	DSY-A-MW02-01	6/6	-	17,100	NA	NA	NA	NA	No	NUT
	7440-23-5	Sodium	29,700	200,000	ug/L	DSY-A-MW02-01	6/6	-	200,000	NA	NA	NA	NA	No	NUT
	7440-66-6	Zinc	6.65	68.3	ug/L	DSY-A-MW02-01	4/6	15.2 - 17.3	68.3	NA	NA	NA	NA	No	NTX
	Dissolved Metals														
	7429-90-5	Aluminum	72	72	ug/L	DSY-GW-MW204-031711	1/1	-	72	NA	NA	NA	NA	No	NTX
	7440-39-3	Barium	11.5	11.5	ug/L	DSY-GW-MW204-031711	1/1	-	11.5	NA	NA	NA	NA	No	NTX
	7440-70-2	Calcium	30,800 J	30,800 J	ug/L	DSY-GW-MW204-031711	1/1	-	30,800	NA	NA	NA	NA	No	NUT
	7440-50-8	Copper	1.19 J	1.19 J	ug/L	DSY-GW-MW204-031711	1/1	-	1.19	NA	NA	NA	NA	No	NTX
	7439-89-6	Iron	50.5 J	50.5 J	ug/L	DSY-GW-MW204-031711	1/1	-	50.5	NA	NA	NA	NA	No	NTX
	7439-95-4	Magnesium	7,450 J	7,450 J	ug/L	DSY-GW-MW204-031711	1/1	-	7,450	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	53.3	53.3	ug/L	DSY-GW-MW204-031711	1/1	-	53.3	NA	NA	NA	NA	No	NTX
	7440-02-0	Nickel	3.39	3.39	ug/L	DSY-GW-MW204-031711	1/1	-	3.39	NA	NA	NA	NA	No	NTX
	7440-09-7	Potassium	1,770	1,770	ug/L	DSY-GW-MW204-031711	1/1	-	1,770	NA	NA	NA	NA	No	NUT
	7440-23-5	Sodium	42,300	42,300	ug/L	DSY-GW-MW204-031711	1/1	-	42,300	NA	NA	NA	NA	No	NUT
	7440-66-6	Zinc	6.48	6.48	ug/L	DSY-GW-MW204-031711	1/1	-	6.48	NA	NA	NA	NA	No	NTX

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - No background data is available for groundwater.
- 5 - USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0, May 2012 RSLs.
Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-GW-MW02A-022411	DSY-GW-MW220-030111
DSY-GW-MW03-022411	DSY-GW-MW221-030211
DSY-GW-MW11A-022611	DSY-GW-MW222-030211
DSY-GW-MW11A-022611-D	DSY-GW-MW223-031611
DSY-GW-MW12-030311	DSY-A-MW03-01-D
DSY-GW-MW204-031711	DSY-A-MW04-01
DSY-A-MW02-01	DSY-A-MW11-01
DSY-A-MW03-01	DSY-A-MW12-01

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
J = Estimated value
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient
NVT = Not sufficiently volatile and/or toxic to pose inhalation risk.

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL GAS - NORTH WATERFRONT
FORMER ROBERT E. DERECTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

Scenario Timeframe:
Medium: Soil Gas
Exposure Medium: Soil Gas

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Range of Background Concentrations ⁽⁴⁾	Screening Toxicity Value ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
North Waterfront	Volatile Organic Compounds														
	71-55-6	1,1,1-Trichloroethane	0.055 J	0.26	ug/m ³	DSY-SG-MW03-0608, DSY-SG-MW03-0608-D	4/4	-	0.26	NA	5,200 N	NA	NA	No	BSL
	76-13-1	1,1,2-Trichlorotrifluoroethane	0.5 J	0.79 J	ug/m ³	DSY-SG-MW02A-0708	4/4	-	0.79	NA	31,000 N	NA	NA	No	BSL
	75-34-3	1,1-Dichloroethane	0.076 J	0.25	ug/m ³	DSY-SG-MW02A-0708	4/4	-	0.25	NA	15 C	NA	NA	No	BSL
	95-63-6	1,2,4-Trimethylbenzene	0.38 J	2.4 J	ug/m ³	DSY-SG-MW03-0608	4/4	0.35 - 0.35	2.4	NA	7.3 N	NA	NA	No	BSL
	108-67-8	1,3,5-Trimethylbenzene	0.3 J	1.1	ug/m ³	DSY-SG-MW03-0608	2/4	0.34 - 0.39	1.1	NA	7.3 N ⁽⁶⁾	NA	NA	No	BSL
	106-99-0	1,3-Butadiene	2.3	13	ug/m ³	DSY-SG-MW11A-0203	4/4	-	13	NA	0.81 C	NA	NA	Yes	ASL
	622-96-8	1-Ethyl-4-Methyl Benzene	0.36 J	1.5 J	ug/m ³	DSY-SG-MW03-0608	4/4	0.35 - 0.35	1.5	NA	NA	NA	NA	No	NTX
	78-93-3	2-Butanone	3.3	17	ug/m ³	DSY-SG-MW11A-0203	4/4	-	17	NA	5,200 N	NA	NA	No	BSL
	591-78-6	2-Hexanone	0.28 J	1 J	ug/m ³	DSY-SG-MW12-0506	3/4	1.1 - 1.1	1	NA	31 N	NA	NA	No	BSL
	108-10-1	4-Methyl-2-Pentanone	0.21 J	0.97	ug/m ³	DSY-SG-MW12-0506	4/4	-	0.97	NA	3,100 N	NA	NA	No	BSL
	107-13-1	Acrylonitrile	2.8	2.8	ug/m ³	DSY-SG-MW11A-0203	1/4	1.4 - 1.8	2.8	NA	0.36 C	NA	NA	Yes	ASL
	71-43-2	Benzene	0.67	6.8	ug/m ³	DSY-SG-MW11A-0203	4/4	-	6.8	NA	3.1 C	NA	NA	Yes	ASL
	108-90-7	Chlorobenzene	0.17 J	0.3 J	ug/m ³	DSY-SG-MW11A-0203	2/4	0.31 - 0.32	0.3	NA	52 N	NA	NA	No	BSL
	75-00-3	Chloroethane	0.6 J	1.3 J	ug/m ³	DSY-SG-MW11A-0203	2/4	0.17 - 0.18	1.3	NA	10,000 N	NA	NA	No	BSL
	67-66-3	Chloroform	0.14 J	0.7 J	ug/m ³	DSY-SG-MW11A-0203	4/4	-	0.7	NA	1.1 C	NA	NA	No	BSL
	74-87-3	Chloromethane	1.3	4.9	ug/m ³	DSY-SG-MW11A-0203	2/4	0.13 - 0.14	4.9	NA	94 N	NA	NA	No	BSL
	156-59-2	cis-1,2-Dichloroethene	0.062 J	27	ug/m ³	DSY-SG-MW11A-0203	3/4	0.014 - 0.017	27	NA	63 N ⁽⁷⁾	NA	NA	No	BSL
	110-82-7	Cyclohexane	0.3 J	1.8	ug/m ³	DSY-SG-MW02A-0708	3/4	0.24 - 0.24	1.8	NA	6,300 N	NA	NA	No	BSL
	75-71-8	Dichlorodifluoromethane	2	3	ug/m ³	DSY-SG-MW03-0608, DSY-SG-MW03-0608-D	4/4	-	3	NA	100 N	NA	NA	No	BSL
	100-41-4	Ethylbenzene	0.13 J	1.1	ug/m ³	DSY-SG-MW02A-0708	4/4	-	1.1	NA	9.7 C	NA	NA	No	BSL
	110-54-3	Hexane	1.7	4.8	ug/m ³	DSY-SG-MW02A-0708	4/4	-	4.8	NA	730 N	NA	NA	No	BSL
	- -	m+p-Xylenes	0.15 J	1.7	ug/m ³	DSY-SG-MW12-0506	4/4	-	1.7	NA	100 N ⁽⁶⁾	NA	NA	No	BSL
	1634-04-4	Methyl Tert-Butyl Ether	0.0085 J	0.015 J	ug/m ³	DSY-SG-MW12-0506	2/4	0.014 - 0.016	0.015	NA	94 C	NA	NA	No	BSL
	75-09-2	Methylene Chloride	0.65 J	1.5	ug/m ³	DSY-SG-MW03-0608	3/4	0.23 - 0.23	1.5	NA	630 N ⁽⁹⁾	NA	NA	No	BSL
	142-82-5	n-Heptane	0.47 J	2.7	ug/m ³	DSY-SG-MW12-0506	4/4	-	2.7	NA	NA	NA	NA	No	NTX
	95-47-6	o-Xylene	0.064 J	0.8	ug/m ³	DSY-SG-MW12-0506	4/4	-	0.8	NA	100 N	NA	NA	No	BSL
	100-42-5	Styrene	0.43 J	0.69	ug/m ³	DSY-SG-MW11A-0203	2/4	0.28 - 0.29	0.69	NA	1,000 N	NA	NA	No	BSL
	127-18-4	Tetrachloroethene	1	12	ug/m ³	DSY-SG-MW11A-0203	4/4	-	12	NA	42 N ⁽⁹⁾	NA	NA	No	BSL
	108-88-3	Toluene	0.67	7.2	ug/m ³	DSY-SG-MW02A-0708	4/4	-	7.2	NA	5,200 N	NA	NA	No	BSL
	540-59-0	Total 1,2-Dichloroethene	0.062 J	31.1	ug/m ³	DSY-SG-MW11A-0203	3/4	0.014 - 0.017	31.1	NA	63 N ⁽⁹⁾	NA	NA	No	BSL
	1330-20-7	Total Xylenes	0.214 J	2.5	ug/m ³	DSY-SG-MW12-0506	4/4	-	2.5	NA	100 N	NA	NA	No	BSL
	156-60-5	trans-1,2-Dichloroethene	4.1	4.1	ug/m ³	DSY-SG-MW11A-0203	1/4	0.013 - 0.017	4.1	NA	63 N	NA	NA	No	BSL
	79-01-6	Trichloroethene	0.088 J	120	ug/m ³	DSY-SG-MW11A-0203	4/4	-	120	NA	2.1 N ⁽⁹⁾	NA	NA	Yes	ASL
	75-69-4	Trichlorofluoromethane	1.8	7.4	ug/m ³	DSY-SG-MW12-0506	4/4	-	7.4	NA	730 N	NA	NA	No	BSL
	75-01-4	Vinyl Chloride	0.15 J	0.76	ug/m ³	DSY-SG-MW02A-0708	4/4	-	0.76	NA	1.6 C	NA	NA	No	BSL

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL GAS - NORTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - No background data is available.
- 5 - USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
- 6 - Value is for 1,2,4-trimethylbenzene.
- 7 - Value is for trans-1,2-dichloroethene.
- 8 - Value is for m-xylene.
- 9 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-SG-MW02A-0708	DSY-SG-MW03-0608-D	DSY-SG-MW12-0506
DSY-SG-MW03-0608	DSY-SG-MW11A-0203	

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 2.6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Central Shipyards	Semivolatile Organic Compounds													
	108-60-1	2,2'-Oxybis(1-Chloropropane)	180 J	180 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	180	NA	4,600 C	NA	No	BSL
	95-48-7	2-Methylphenol	83 J	83 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	83	NA	310,000 N	NA	No	BSL
	106-44-5	4-Methylphenol	500 J	500 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	500	NA	610,000 N	NA	No	BSL
	83-32-9	Acenaphthene	92 J	92 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	92	NA	340,000 N	43,000	No	BSL
	120-12-7	Anthracene	130 J	130 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	130	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	140 J	410 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	410	NA	150 C	900	Yes	ASL
	50-32-8	Benzo(a)pyrene	86 J	140 J	ug/kg	DSY-S-TP17-0001	2/6	330 - 400	140	NA	15 C	400	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	230 J	410 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	410	NA	150 C	900	Yes	ASL
	191-24-2	Benzo(g,h,i)perylene	110 J	130 J	ug/kg	DSY-S-TP17-0001	2/6	330 - 400	130	NA	170,000 N ⁽⁹⁾	800	No	BSL
	207-08-9	Benzo(k)fluoranthene	360 J	360 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	360	NA	1,500 C	900	No	BSL
	86-74-8	Carbazole	97 J	97 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	97	NA	NA	NA	No	NTX
	218-01-9	Chrysene	120 J	420 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	420	NA	15,000 C	400	Yes	ASL
	206-44-0	Fluoranthene	330 J	870 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	870	NA	230,000 N	20,000	No	BSL
	86-73-7	Fluorene	65 J	65 J	ug/kg	DSY-S-TP15-0001	1/6	330 - 400	65	NA	230,000 N	28,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	140 J	150 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	150	NA	150 C	900	No	BSL
	85-01-8	Phenanthrene	130 J	580 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	580	NA	170,000 N ⁽⁹⁾	40,000	No	BSL
	108-95-2	Phenol	1,200 J	1,200 J	ug/kg	DSY-S-TP17-0001	1/6	330 - 400	1,200	NA	1,800,000 N	6,000,000	No	BSL
	129-00-0	Pyrene	300 J	740 J	ug/kg	DSY-S-TP15-0001	2/6	330 - 400	740	NA	170,000 N	13,000	No	BSL
	Pesticides/PCBs													
	72-54-8	4,4'-DDD	4.3	4.3	ug/kg	DSY-S-TP15-0001	1/6	3.3 - 4	4.3	NA	2,000 C	NA	No	BSL
	50-29-3	4,4'-DDT	6.2	6.2	ug/kg	DSY-S-TP15-0001	1/6	3.3 - 4	6.2	NA	1,700 C	NA	No	BSL
	11096-82-5	Aroclor-1260	32 J	32 J	ug/kg	DSY-S-TP15-0001	1/6	33 - 40	32	NA	220 C	NA	No	BSL
	Metals													
	7429-90-5	Aluminum	5,820	13,200	mg/kg	DSY-S-TP12-0001	6/6	-	13,200	16,020	7,700 N	NA	No	BKG
	7440-38-2	Arsenic	3.9	24.4	mg/kg	DSY-S-TP11-0001	6/6	-	24.4	13	0.39 C	7	Yes	ASL
	7440-39-3	Barium	12.1	24	mg/kg	DSY-S-TP15-0001	6/6	-	24	51	1,500 N	5,500	No	BSL, BKG
	7440-41-7	Beryllium	0.23 J	0.47	mg/kg	DSY-S-TP15-0001	6/6	-	0.47	0.58	16 N	1.5	No	BSL, BKG
	7440-43-9	Cadmium	0.75 J	1 J	mg/kg	DSY-S-TP15-0001	4/6	0.48 - 0.61	1	0.17	7 N	39	No	BSL
	7440-70-2	Calcium	426 J	1,130 J	mg/kg	DSY-S-MW07-0001	6/6	-	1,130	1,600	NA	NA	No	NUT, BKG
	7440-47-3	Chromium	9.6	18.2	mg/kg	DSY-S-TP12-0001	6/6	-	18.2	16	0.29 C ⁽⁹⁾	390 ⁽⁹⁾	Yes	ASL
	7440-48-4	Cobalt	7.6 J	14.7	mg/kg	DSY-S-MW07-0001	6/6	-	14.7	9	2.3 N	NA	Yes	ASL
	7440-50-8	Copper	15.1	31.8	mg/kg	DSY-S-TP12-0001	6/6	-	31.8	12	310 N	3,100	No	BSL
	7439-89-6	Iron	18,000	32,500	mg/kg	DSY-S-TP12-0001	6/6	-	32,500	24,200	5,600 N	NA	Yes	ASL
	7439-92-1	Lead	5.8 J	27.4	mg/kg	DSY-S-TP15-0001	6/6	-	27.4	40	400	150	No	BSL, BKG
	7439-95-4	Magnesium	2,310	3,970	mg/kg	DSY-S-TP12-0001	6/6	-	3,970	2,571	NA	NA	No	NUT
	7439-96-5	Manganese	272	448	mg/kg	DSY-S-MW07-0001	6/6	-	448	349	180 N	390	Yes	ASL
	7439-97-6	Mercury	0.12	0.12	mg/kg	DSY-S-MW07-0001	1/6	0.05 - 0.13	0.12	0.18	2.3 N ⁽¹⁰⁾	23	No	BSL, BKG
	7440-02-0	Nickel	14.5	27.1	mg/kg	DSY-S-TP12-0001	6/6	-	27.1	15	150 N	1,000	No	BSL
	7440-09-7	Potassium	241	606	mg/kg	DSY-S-TP17-0001	6/6	-	606	651	NA	NA	No	NUT, BKG
	7782-49-2	Selenium	0.74 J	1.2	mg/kg	DSY-S-TP15-0001	3/6	0.62 - 0.82	1.2	0.57	39 N	390	No	BSL
	7440-23-5	Sodium	87.9	87.9	mg/kg	DSY-S-TP17-0001	1/6	22.6 - 69.7	87.9	231	NA	NA	No	NUT, BKG
	7440-62-2	Vanadium	8.6	21.8 J	mg/kg	DSY-S-TP15-0001	6/6	-	21.8	34	39 N	550	No	BSL, BKG
	7440-66-6	Zinc	32.7 J	71	mg/kg	DSY-S-TP15-0001	6/6	-	71	62	2,300 N	6,000	No	BSL
	Miscellaneous Parameters													
	1461-25-2	Tetrabutyltin	8.8 J	8.8 J	ug/kg	DSY-S-TP15-0001	1/6	49 - 50	8.8	NA	1,800 N ⁽¹¹⁾	NA	No	BSL
	56573-85-4	Tributyltin	4.8 J	4.8 J	ug/kg	DSY-S-TP15-0001	1/6	49 - 50	4.8	NA	1,800 N	NA	No	BSL

TABLE 2.6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Value is for pyrene.
- 9 - Value is for hexavalent chromium.
- 10 - Value is for mercuric chloride (and other mercury salts).
- 11 - Value is for dibutyltin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-S-MW05-SS01
DSY-S-MW05-SS01-D
DSY-S-MW07-0001
DSY-S-TP11-0001
DSY-S-TP12-0001
DSY-S-TP15-0001
DSY-S-TP17-0001

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 2.7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Central Shipyard	Volatile Organic Compounds													
	67-64-1	Acetone	7 B	110 B	ug/kg	N1-250	17/35	11 - 110	110	NA	6,100,000 N	7,800,000	No	BSL
	75-15-0	Carbon Disulfide	4 J	4 J	ug/kg	DSY-S-MW07-2224	1/18	11 - 13	4	NA	82,000 N	NA	No	BSL
	75-09-2	Methylene Chloride	1 JB	1 JB	ug/kg	N1-A, N1-E, S42 SWN	3/21	11 - 34	1	NA	11,000 C	45,000	No	BSL
	108-88-3	Toluene	0.9 J	10 J	ug/kg	S42 SWN	3/20	11 - 13	10	NA	500,000 N	190,000	No	BSL
	1330-20-7	Total Xylenes	1 J	1 J	ug/kg	S42 SWN	1/19	11 - 13	1	NA	63,000 N	110,000	No	BSL
	Semivolatile Organic Compounds													
	91-57-6	2-Methylnaphthalene	50 J	280 J	ug/kg	DSY-S-MW07-0810	3/18	340 - 4000	280	NA	23,000 N	123,000	No	BSL
	83-32-9	Acenaphthene	41 J	270 J	ug/kg	N1-B	3/21	340 - 4000	270	NA	340,000 N	43,000	No	BSL
	208-96-8	Acenaphthylene	43 J	43 J	ug/kg	S42 SWN	1/19	340 - 4000	43	NA	340,000 N ⁽⁸⁾	23,000	No	BSL
Central Shipyard	120-12-7	Anthracene	48 J	490	ug/kg	N1-B	5/23	340 - 4000	490	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	47 J	1,300	ug/kg	N1-B	10/25	340 - 4000	1,300	NA	150 C	900	Yes	ASL
	50-32-8	Benzo(a)pyrene	42 J	690	ug/kg	N1-B	11/25	340 - 4000	690	NA	15 C	400	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	63 J	910	ug/kg	N1-B	11/25	340 - 4000	910	NA	150 C	900	Yes	ASL
	191-24-2	Benzo(g,h,i)perylene	56 J	250 J	ug/kg	S42 SWN	4/21	340 - 4000	250	NA	170,000 N ⁽⁹⁾	800	No	BSL
	207-08-9	Benzo(k)fluoranthene	42 J	350	ug/kg	N1-B	7/24	340 - 4000	350	NA	1,500 C	900	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	39 J	160 J	ug/kg	DPSOIL02	5/23	340 - 4000	160	NA	35,000 C	46,000	No	BSL
	85-68-7	Butyl Benzyl Phthalate	48 J	48 J	ug/kg	DSY-SB-09-1416	1/18	340 - 4000	48	NA	260,000 C	NA	No	BSL
	218-01-9	Chrysene	51 J	1,300	ug/kg	N1-B	12/25	340 - 4000	1,300	NA	15,000 C	400	Yes	ASL
	53-70-3	Dibenzo(a,h)anthracene	46 J	46 J	ug/kg	N1-250	1/19	340 - 4000	46	NA	15 C	400	Yes	ASL
	206-44-0	Fluoranthene	41 J	4,400	ug/kg	N1-B	17/30	340 - 4000	4,400	NA	230,000 N	20,000	No	BSL
	86-73-7	Fluorene	44 J	730	ug/kg	N1-B	3/21	340 - 4000	730	NA	230,000 N	28,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	62 J	240 J	ug/kg	S42 SWN	4/22	340 - 4000	240	NA	150 C	900	Yes	ASL
	91-20-3	Naphthalene	1 J	77 J	ug/kg	DPSOIL02	3/20	340 - 4000	77	NA	3,600 C	54,000	No	BSL
	85-01-8	Phenanthrene	37 J	5,200	ug/kg	N1-B	14/26	340 - 4000	5,200	NA	170,000 N ⁽¹⁰⁾	40,000	No	BSL
	129-00-0	Pyrene	34 J	3,000	ug/kg	N1-B	17/30	340 - 4000	3,000	NA	170,000 N	13,000	No	BSL
	Pesticides/PCBs													
	72-54-8	4,4'-DDD	7.4 J	220 J	ug/kg	DSY-S-MW07-1618-D	3/18	3.4 - 5.3	220	NA	2,000 C	NA	No	BSL
	72-55-9	4,4'-DDE	11 J	11 J	ug/kg	DSY-S-MW07-1618-D	1/18	3.4 - 5.3	11	NA	1,400 C	NA	No	BSL
	50-29-3	4,4'-DDT	100 J	100 J	ug/kg	DSY-S-MW07-1618-D	1/18	3.4 - 5.3	100	NA	1,700 C	NA	No	BSL
	11096-82-5	Aroclor-1260	13 J	13 J	ug/kg	DSY-S-TP25-1011	1/18	34 - 53	13	NA	220 C	NA	No	BSL
	1336-36-3	Total Aroclors	58 P	100	ug/kg	S42 SWN	2/2	-	100	NA	220 C	10,000	No	BSL
	72-20-8	Endrin	5.5	5.5	ug/kg	DSY-S-TP11-1213	1/18	3.4 - 5.3	5.5	NA	1,800 N	NA	No	BSL
	Metals													
	7429-90-5	Aluminum	4,820	14,300	mg/kg	DSY-S-TP12-1213	27/27	-	14,300	13,075	7,700 N	NA	Yes	ASL
	7440-38-2	Arsenic	3.9	37.3	mg/kg	DSY-S-TP12-1213	43/44	4.1 - 4.1	37.3	20	0.39 C	7	Yes	ASL
	7440-39-3	Barium	6.3	37	mg/kg	S42 SWN	42/44	2.6 - 4.1	37	36	1,500 N	5,500	No	BSL
	7440-41-7	Beryllium	0.22 J	0.54	mg/kg	DSY-S-TP13-1011	23/27	0.18 - 0.23	0.54	0.64	16 N	1.5	No	BSL, BKG
	7440-43-9	Cadmium	0.7 J	2.8	mg/kg	N1-0	24/44	0.51 - 1.3	2.8	0.23	7 N	39	No	BSL
	7440-70-2	Calcium	363 J	3,630 J	mg/kg	DSY-SB-09-1416	27/27	-	3,630	1,689	NA	NA	No	NUT
	7440-47-3	Chromium	6.3 J	22	mg/kg	N1-0	44/44	-	22	18	0.29 C ⁽¹⁰⁾	390 ⁽¹⁰⁾	Yes	ASL
	7440-48-4	Cobalt	3.9 J	20.2 J	mg/kg	DSY-S-TP11-1213	27/27	-	20.2	17	2.3 N	NA	Yes	ASL
	7440-50-8	Copper	5.1 J	27.9	mg/kg	DSY-S-TP25-0507	27/27	-	27.9	24	310 N	3,100	No	BSL
	7439-89-6	Iron	14,300	40,100	mg/kg	DSY-S-TP11-1213	27/27	-	40,100	39,173	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	2.1 J	45	mg/kg	N1-E	44/44	-	45	12	400	150	No	BSL
	7439-95-4	Magnesium	1,900	4,530	mg/kg	DSY-S-TP12-1213	27/27	-	4,530	3,811	NA	NA	No	NUT
	Metals (continued)													
	7439-96-5	Manganese	86.2 J	612 J	mg/kg	DSY-S-TP11-1213	27/27	-	612	1,037	180 N	390	No	BKG
	7439-97-6	Mercury	0.07	0.15	mg/kg	DSY-S-MW07-1618-D	2/27	0.04 - 0.13	0.15	0.012	2.3 N ⁽¹¹⁾	23	No	BSL
	7440-02-0	Nickel	10.4 J	33.1	mg/kg	DSY-S-TP11-1213	27/27	-	33.1	28	150 N	1,000	No	BSL
	7440-09-7	Potassium	190	658	mg/kg	DSY-SB-14-0103-D	27/27	179 - 179	658	1,699	NA	NA	No	NUT, BKG
	7782-49-2	Selenium	0.83 J	1.4	mg/kg	DSY-S-TP13-0506	4/25	0.68 - 1.1	1.4	0.286	39 N	390	No	BSL
	7440-22-4	Silver	1.6 J	5	mg/kg	N1-0	10/36	1 - 1.6	5	0.12	39 N	200	No	BSL
	7440-23-5	Sodium	82.8	228	mg/kg	DSY-S-MW07-3436	3/27	21.4 - 143	228	83	NA	NA	No	NUT
	7440-62-2	Vanadium	8.9 J	22.8 J	mg/kg	DSY-SB-10-1416	27/27	-	22.8	23	39 N	550	No	BSL, BKG
	7440-66-6	Zinc	28 J	82.5	mg/kg	DSY-SB-03-0911	27/27	-	82.5	66	2,300 N	6,000	No	BSL

TABLE 2.7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
	Miscellaneous Parameters													
	1461-25-2	Tetrabutyltin	4.6 J	27 J	ug/kg	DSY-S-TP13-0506	1/18	49 - 50	27	NA	1,800 N ⁽¹²⁾	NA	No	BSL
	56573-85-4	Tributyltin	4.9 J	4.9 J	ug/kg	DSY-S-MW05-1012	1/18	49 - 50	4.9	NA	1,800 N	NA	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Value is for acenaphthene.
- 9 - Value is for pyrene.
- 10 - Value is for hexavalent chromium.
- 11 - Value is for mercuric chloride (and other mercury salts).
- 12 - Value is for dibutyltin and tributyltin.

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-S-MW04-3234	DSY-SB-01-0911
DSY-S-MW05-1012	DSY-SB-03-0911
DSY-S-MW05-2224	DSY-SB-09-1416
DSY-S-MW05-3234	DSY-SB-10-1416
DSY-S-MW05-4446	DSY-SB-14-0103
DSY-S-MW07-0810	DSY-SB-14-0103-D
DSY-S-MW07-1618	DSY-SB-15-0103
DSY-S-MW07-1618-D	DSY-S-TP11-0507
DSY-S-MW07-2224	DSY-S-TP11-1213
DSY-S-MW07-3436	DSY-S-TP12-0507
N1-0	DSY-S-TP12-1213
N1-100	DSY-S-TP13-0506
N1-150	DSY-S-TP13-0506-D
N1-200	DSY-S-TP13-1011
N1-250	DSY-S-TP15-0506
N1-50	DSY-S-TP15-1112
N1-A	DSY-S-TP17-0507
N1-B	DSY-S-TP17-1112
N1-C	DSY-S-TP25-0507
N1-D	DSY-S-TP25-1011
N1-E	DPSOIL02
S1	
S42 BOT	
S42 SWE	
S42 SWN	
S42 SWS	
S42 SWW	

TABLE 2.8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Central Shipyard	Volatile Organic Compounds														
	67-64-1	Acetone	3.28 J	3.28 J	ug/L	DSY-GW-MW219-031611-D	1/4	5 - 10	3.28	NA	1,200 N	NA NA	NA NA	No	BSL
	Metals (Total)														
	7429-90-5	Aluminum	52.9	1,240	ug/L	DSY-A-MW07-01	3/4	16 - 16	1,240	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	Yes	ASL
	7440-38-2	Arsenic	27.8	78.1 J	ug/L	DSY-GW-MW219-031611-D	3/4	4 - 4	78.1	NA	0.045 C	10 10	EPA-MCL RIDE M	Yes	ASL
	7440-39-3	Barium	34	86.6	ug/L	DSY-GW-MW218-030111	4/4	-	86.6	NA	290 N	2,000 2,000	EPA-MCL RIDE M	No	BSL
	7440-43-9	Cadmium	1.41	1.53	ug/L	DSY-GW-MW219-031611	1/4	0.5 - 3	1.53	NA	0.69 N	5 5	EPA-MCL RIDE M	Yes	ASL
	7440-70-2	Calcium	14,100	126,000	ug/L	DSY-A-MW05-01	4/4	-	126,000	NA	NA	NA NA	NA NA	No	NUT
	7440-47-3	Chromium	12.8 J	12.8 J	ug/L	DSY-A-MW07-01	1/4	1 - 6	12.8	NA	0.031 C	100 100	EPA-MCL RIDE M	Yes	ASL
	7440-48-4	Cobalt	13.7	24.8	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 4.5	24.8	NA	0.47 N	NA NA	NA NA	Yes	ASL
	7439-89-6	Iron	1,260	65,800 J	ug/L	DSY-GW-MW219-031611-D	4/4	-	65,800	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
	7439-92-1	Lead	1.07 J	1.8 J	ug/L	DSY-A-MW07-01	2/4	1 - 3.75	1.8	NA	NA	15 15	EPA-MCL RIDE M	No	BSL
	7439-95-4	Magnesium	5,430	40,000	ug/L	DSY-A-MW05-01	4/4	-	40,000	NA	NA	NA NA	NA NA	No	NUT
	7439-96-5	Manganese	753	9,100	ug/L	DSY-GW-MW218-030111	4/4	-	9,100	NA	32 N	50 NA	EPA-SDWR NA	Yes	ASL
	7440-02-0	Nickel	4.64	4.64	ug/L	DSY-GW-MW218-030111	1/4	1.5 - 11.3	4.64	NA	30 N	NA 100	NA RIDE M	No	BSL
	7440-09-7	Potassium	2,490	11,000	ug/L	DSY-GW-MW218-030111	4/4	-	11,000	NA	NA	NA NA	NA NA	No	NUT
	7782-49-2	Selenium	1.24 J	1.55 J	ug/L	DSY-GW-MW219-031611	1/4	4 - 6.25	1.55	NA	7.8 N	50 50	EPA-MCL RIDE M	No	BSL
	7440-23-5	Sodium	34,400	379,000	ug/L	DSY-A-MW05-01	4/4	-	379,000	NA	NA	NA NA	NA NA	No	NUT
	7440-66-6	Zinc	1.52 J	3.59 J	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 26.4	3.59	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
	Metals (Dissolved)														
	7429-90-5	Aluminum	29.7 J	38 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	38	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	No	BSL
	7440-38-2	Arsenic	29.1	78.9 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	78.9	NA	0.045 C	10 10	EPA-MCL RIDE M	Yes	ASL
	7440-39-3	Barium	33.7	84.4	ug/L	DSY-GW-MW218-030111	2/2	-	84.4	NA	290 N	2,000 2,000	EPA-MCL RIDE M	No	BSL
	7440-43-9	Cadmium	1.52	1.62	ug/L	DSY-GW-MW219-031611	1/2	0.5 - 0.5	1.62	NA	0.69 N	5 5	EPA-MCL RIDE M	Yes	ASL
	7440-70-2	Calcium	39,000 J	76,600	ug/L	DSY-GW-MW218-030111	2/2	-	76,600	NA	NA	NA NA	NA NA	No	NUT
	7440-48-4	Cobalt	13.6	24.2	ug/L	DSY-GW-MW218-030111	2/2	-	24.2	NA	0.47 N	NA NA	NA NA	Yes	ASL
	7439-89-6	Iron	9,900	63,900 J	ug/L	DSY-GW-MW219-031611	2/2	-	63,900	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
	7439-92-1	Lead	0.488 J	0.667 J	ug/L	DSY-GW-MW219-031611	1/2	3.75 - 3.75	0.667	NA	NA	15 15	EPA-MCL RIDE M	No	BSL
	7439-95-4	Magnesium	8,090 J	16,200	ug/L	DSY-GW-MW218-030111	2/2	-	16,200	NA	NA	NA NA	NA NA	No	NUT
	7439-96-5	Manganese	4,610	8,680	ug/L	DSY-GW-MW218-030111	2/2	-	8,680	NA	32 N	50 NA	EPA-SDWR NA	Yes	ASL
	7440-02-0	Nickel	4.73	4.73	ug/L	DSY-GW-MW218-030111	1/2	1.75 - 1.75	4.73	NA	30 N	NA 100	NA RIDE M	No	BSL
Dissolved Metals (Continued)															

TABLE 2.8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
	7440-09-7	Potassium	6,240	10,800	ug/L	DSY-GW-MW218-030111	2/2	-	10,800	NA	NA	NA	NA	No	NUT
	7782-49-2	Selenium	1.34 J	1.44 J	ug/L	DSY-GW-MW219-031611-D	1/2	6.25 - 6.25	1.44	NA	7.8 N	50	EPA-MCL RIDE M	No	BSL
	7440-23-5	Sodium	35,800	61,900	ug/L	DSY-GW-MW218-030111	2/2	-	61,900	NA	NA	NA	NA	No	NUT
	7440-66-6	Zinc	3.5 J	3.5 J	ug/L	DSY-GW-MW218-030111	1/2	2.5 - 2.5	3.5	NA	470 N	5,000	EPA-SDWR NA	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - No background data is available for groundwater.
- 5 - USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
- 6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-A-MW05-01
DSY-A-MW07-01
DSY-GW-MW218-030111
DSY-GW-MW219-031611
DSY-GW-MW219-031611-D
DSY-GW-MW219-031611-AVG

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)
EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
RIDE M = Rhode Island Department of Environmental Management GA Groundwater Objective (November, 2011).

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 2.9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - CENTRAL SHIPYARD
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Screening Toxicity Value ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Central Shipyard	Volatile Organic Compounds														
	67-64-1	Acetone	3.28 J	3.28 J	ug/L	DSY-GW-MW219-031611-D	1/4	5 - 10	3.28	NA	2,300,000 N	NA	NA	No	BSL
	Metals														
	7429-90-5	Aluminum	52.9	1,240	ug/L	DSY-A-MW07-01	3/4	16 - 16	1,240	NA	NA	NA	NA	No	NTX
	7440-38-2	Arsenic	27.8	78.1 J	ug/L	DSY-GW-MW219-031611-D	3/4	4 - 4	78.1	NA	NA	NA	NA	No	NTX
	7440-39-3	Barium	34	86.6	ug/L	DSY-GW-MW218-030111	4/4	-	86.6	NA	NA	NA	NA	No	NTX
	7440-43-9	Cadmium	1.41	1.53	ug/L	DSY-GW-MW219-031611	1/4	0.5 - 3	1.53	NA	NA	NA	NA	No	NTX
	7440-70-2	Calcium	14,100	126,000	ug/L	DSY-A-MW05-01	4/4	-	126,000	NA	NA	NA	NA	No	NUT
	7440-47-3	Chromium	12.8 J	12.8 J	ug/L	DSY-A-MW07-01	1/4	1 - 6	12.8	NA	NA	NA	NA	No	NTX
	7440-48-4	Cobalt	13.7	24.8	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 4.5	24.8	NA	NA	NA	NA	No	NTX
	7439-89-6	Iron	1,260	65,800 J	ug/L	DSY-GW-MW219-031611-D	4/4	-	65,800	NA	NA	NA	NA	No	NTX
	7439-92-1	Lead	1.07 J	1.8 J	ug/L	DSY-A-MW07-01	2/4	1 - 3.75	1.8	NA	NA	NA	NA	No	NTX
	7439-95-4	Magnesium	5,430	40,000	ug/L	DSY-A-MW05-01	4/4	-	40,000	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	753	9,100	ug/L	DSY-GW-MW218-030111	4/4	-	9,100	NA	NA	NA	NA	No	NTX
	7440-02-0	Nickel	4.64	4.64	ug/L	DSY-GW-MW218-030111	1/4	1.5 - 11.3	4.64	NA	NA	NA	NA	No	NTX
	7440-09-7	Potassium	2,490	11,000	ug/L	DSY-GW-MW218-030111	4/4	-	11,000	NA	NA	NA	NA	No	NUT
	7782-49-2	Selenium	1.24 J	1.55 J	ug/L	DSY-GW-MW219-031611	1/4	4 - 6.25	1.55	NA	NA	NA	NA	No	NTX
	7440-23-5	Sodium	34,400	379,000	ug/L	DSY-A-MW05-01	4/4	-	379,000	NA	NA	NA	NA	No	NUT
	7440-66-6	Zinc	1.52 J	3.59 J	ug/L	DSY-GW-MW218-030111	2/4	3.9 - 26.4	3.59	NA	NA	NA	NA	No	NTX
	Dissolved Metals														
	7429-90-5	Aluminum	29.7 J	38 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	38	NA	NA	NA	NA	No	NTX
	7440-38-2	Arsenic	29.1	78.9 J	ug/L	DSY-GW-MW219-031611-D	2/2	-	78.9	NA	NA	NA	NA	No	NTX
	7440-39-3	Barium	33.7	84.4	ug/L	DSY-GW-MW218-030111	2/2	-	84.4	NA	NA	NA	NA	No	NTX
	7440-43-9	Cadmium	1.52	1.62	ug/L	DSY-GW-MW219-031611	1/2	0.5 - 0.5	1.62	NA	NA	NA	NA	No	NTX
	7440-70-2	Calcium	39,000 J	76,600	ug/L	DSY-GW-MW218-030111	2/2	-	76,600	NA	NA	NA	NA	No	NUT
	7440-48-4	Cobalt	13.6	24.2	ug/L	DSY-GW-MW218-030111	2/2	-	24.2	NA	NA	NA	NA	No	NTX
	7439-89-6	Iron	9,900	63,900 J	ug/L	DSY-GW-MW219-031611	2/2	-	63,900	NA	NA	NA	NA	No	NTX
	7439-92-1	Lead	0.488 J	0.667 J	ug/L	DSY-GW-MW219-031611	1/2	3.75 - 3.75	0.667	NA	NA	NA	NA	No	NTX
	7439-95-4	Magnesium	8,090 J	16,200	ug/L	DSY-GW-MW218-030111	2/2	-	16,200	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	4,610	8,680	ug/L	DSY-GW-MW218-030111	2/2	-	8,680	NA	NA	NA	NA	No	NTX
	7440-02-0	Nickel	4.73	4.73	ug/L	DSY-GW-MW218-030111	1/2	1.75 - 1.75	4.73	NA	NA	NA	NA	No	NTX
	7440-09-7	Potassium	6,240	10,800	ug/L	DSY-GW-MW218-030111	2/2	-	10,800	NA	NA	NA	NA	No	NUT
	7782-49-2	Selenium	1.34 J	1.44 J	ug/L	DSY-GW-MW219-031611-D	1/2	6.25 - 6.25	1.44	NA	NA	NA	NA	No	NTX
	7440-23-5	Sodium	35,800	61,900	ug/L	DSY-GW-MW218-030111	2/2	-	61,900	NA	NA	NA	NA	No	NUT
	7440-66-6	Zinc	3.5 J	3.5 J	ug/L	DSY-GW-MW218-030111	1/2	2.5 - 2.5	3.5	NA	NA	NA	NA	No	NTX

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - No background data is available for groundwater.
- 5 - USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-A-MW05-01
DSY-A-MW07-01
DSY-GW-MW218-030111
DSY-GW-MW219-031611
DSY-GW-MW219-031611-D

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered

C = Carcinogen

CAS = Chemical Abstracts Service

COPC = Chemical Of Potential Concern

J = Estimated value

NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BSL = Below COPC Screening Level

NTX = No toxicity criteria

NUT = Essential nutrient

NVT = Not sufficiently volatile and/or toxic to pose inhalation risk.

TABLE 2.10
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Former Building 234	Volatile Organic Compounds													
	108-88-3	Toluene	1 J	2 J	ug/kg	DSY-S-TP08-0001	2/7	10 - 11	2	NA	500,000 N	190,000	No	BSL
	1330-20-7	Total Xylenes	3 J	3 J	ug/kg	DSY-S-MW08-SS01	1/7	10 - 11	3	NA	63,000 N	110,000	No	BSL
	Semivolatile Organic Compounds													
	83-32-9	Acenaphthene	46 J	52 J	ug/kg	DSY-S-MW08-SS01	2/7	340 - 1700	52	NA	340,000 N	43,000	No	BSL
	120-12-7	Anthracene	51 J	110 J	ug/kg	DSY-S-MW08-SS01	3/7	340 - 1700	110	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	60 J	470 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	470	NA	150 C	900	Yes	ASL
	50-32-8	Benzo(a)pyrene	50 J	410 J	ug/kg	DSY-S-MW09-0001	6/8	340 - 710	410	NA	15 C	400	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	36 J	660 J	ug/kg	DSY-S-MW09-0001	7/8	710 - 710	660	NA	150 C	900	Yes	ASL
	191-24-2	Benzo(g,h,i)perylene	48 J	190 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA	170,000 N ⁽⁸⁾	800	No	BSL
	207-08-9	Benzo(k)fluoranthene	76 J	270 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	270	NA	1,500 C	900	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	3,000	8,700	ug/kg	DSY-S-TP07-0001	2/8	350 - 2700	8,700	NA	35,000 C	46,000	No	BSL
	86-74-8	Carbazole	37 J	56 J	ug/kg	DSY-S-TP10-0001	2/7	340 - 1700	56	NA	NA	NA	No	NTX
	218-01-9	Chrysene	41 J	580 J	ug/kg	DSY-S-MW09-0001	7/8	350 - 710	580	NA	15,000 C	400	Yes	ASL
	53-70-3	Dibenzo(a,h)anthracene	62 J	62 J	ug/kg	DSY-S-MW09-0001	1/7	340 - 1700	62	NA	15 C	400	Yes	ASL
	84-74-2	di-n-Butyl Phthalate	51 J	64 J	ug/kg	DSY-S-MW09-0001	2/7	340 - 1700	64	NA	610,000 N	NA	No	BSL
	117-84-0	di-n-Octyl Phthalate	62 J	62 J	ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	62	NA	NA	NA	No	NTX
	206-44-0	Fluoranthene	50 J	770 J	ug/kg	DSY-S-MW09-0001	6/8	710 - 1700	770	NA	230,000 N	20,000	No	BSL
	86-73-7	Fluorene	50 J	50 J	ug/kg	DSY-S-MW08-SS01	1/7	340 - 1700	50	NA	230,000 N	28,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	48 J	190 J	ug/kg	DSY-S-MW09-0001	4/8	340 - 1700	190	NA	150 C	900	Yes	ASL
	85-01-8	Phenanthrene	36 J	420 J	ug/kg	DSY-S-MW08-SS01	6/8	710 - 1700	420	NA	170,000 N ⁽⁹⁾	40,000	No	BSL
	129-00-0	Pyrene	72 J	750 J	ug/kg	DSY-S-MW09-0001	7/8	710 - 710	750	NA	170,000 N	13,000	No	BSL
	Pesticides/PCBs													
	72-55-9	4,4'-DDE	4.5 J	4.5 J	ug/kg	DSY-S-TP08-0001-D	1/7	3.4 - 3.6	4.5	NA	1,400 C	NA	No	BSL
	50-29-3	4,4'-DDT	5 J	8.9	ug/kg	DSY-S-TP08-0001	3/7	3.4 - 3.6	8.9	NA	1,700 C	NA	No	BSL
	11097-69-1	Aroclor-1254	38 J	38 J	ug/kg	DSY-S-MW08-SS01	1/7	34 - 36	38	NA	110 N ⁽⁹⁾	NA	No	BSL
	11096-82-5	Aroclor-1260	24 J	24 J	ug/kg	DSY-S-TP10-0001	1/7	34 - 36	24	NA	220 C	NA	No	BSL
	5103-74-2	gamma-Chlordane	3.9	3.9	ug/kg	DSY-S-TP10-0001	1/7	1.7 - 1.9	3.9	NA	16,000 C ⁽¹⁰⁾	NA	No	BSL
	76-44-8	Heptachlor	4.5	4.5	ug/kg	DSY-S-TP10-0001	1/7	1.7 - 1.9	4.5	NA	110 C	NA	No	BSL
	Metals													
	7429-90-5	Aluminum	3,810	11,300	mg/kg	DSY-S-TP09-0001	7/7	-	11,300	16,020	7,700 N	NA	No	BKG
	7440-38-2	Arsenic	2.6	23.6	mg/kg	DSY-S-TP09-0001	8/8	-	23.6	13	0.39 C	7	Yes	ASL
	7440-39-3	Barium	8.9	180	mg/kg	MW09TP01	8/8	-	180	51	1,500 N	5,500	No	BSL
	7440-41-7	Beryllium	0.18 J	3.5	mg/kg	DSY-S-MW08-SS01	6/7	0.2 - 0.2	3.5	0.58	16 N	1.5	Yes	ASL
	7440-43-9	Cadmium	13	13	mg/kg	MW09TP01	1/8	0.47 - 0.61	13	0.17	7 N	39	Yes	ASL
	7440-70-2	Calcium	521	2,790	mg/kg	DSY-S-MW08-SS01	7/7	-	2,790	1,598	NA	NA	No	NUT
	7440-47-3	Chromium	6.4 J	130	mg/kg	MW09TP01	8/8	-	130	16	0.29 C ⁽¹¹⁾	390 ⁽¹¹⁾	Yes	ASL
	7440-48-4	Cobalt	3.3	23.9	mg/kg	DSY-S-MW08-SS01	7/7	-	23.9	9	2.3 N	NA	Yes	ASL
	7440-50-8	Copper	12.9	262	mg/kg	DSY-S-MW08-SS01	7/7	-	262	12.4	310 N	3,100	No	BSL
	7439-89-6	Iron	7,770	37,200	mg/kg	DSY-S-TP09-0001	7/7	-	37,200	24,200	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	9.7 J	189 J	mg/kg	DSY-S-MW08-SS01	8/8	-	189	40	400	150	Yes	ASL
	7439-95-4	Magnesium	1,170	3,380	mg/kg	DSY-S-TP09-0001	7/7	-	3,380	2,571	NA	NA	No	NUT
	7439-96-5	Manganese	157	597	mg/kg	DSY-S-TP09-0001	7/7	-	597	349	180 N	390	Yes	ASL
	7439-97-6	Mercury	0.07	0.07	mg/kg	DSY-S-MW08-SS01	1/7	0.05 - 0.09	0.07	0.18	2.3 N ⁽¹²⁾	23	No	BSL, BKG
	7440-02-0	Nickel	7.8 J	113	mg/kg	DSY-S-MW08-SS01	7/7	-	113	15	150 N	1,000	No	BSL
	Metals (Continued)													
	7440-09-7	Potassium	227	397	mg/kg	DSY-S-TP26-0001	7/7	-	397	651	NA	NA	No	NUT, BKG
	7782-49-2	Selenium	3	3	mg/kg	MW09TP01	1/8	0.63 - 0.81	3	0.57	39 N	390	No	BSL
	7440-23-5	Sodium	19 J	163 J	mg/kg	DSY-S-MW08-SS01	5/7	20.5 - 45.1	163	231	NA	NA	No	NUT, BKG
	7440-62-2	Vanadium	6.8 J	23.2 J	mg/kg	DSY-S-TP10-0001	7/7	-	23.2	34	39 N	550	No	BSL, BKG
	7440-66-6	Zinc	44.3 J	831 J	mg/kg	DSY-S-MW08-SS01	7/7	-	831	62	2,300 N	6,000	No	BSL
	Miscellaneous Parameters													
	1461-25-2	Tetrabutyltin	11.4 J	11.4 J	ug/kg	DSY-S-TP09-0001	1/7	49 - 50	11.4	NA	1,800 N ⁽¹³⁾	NA	No	BSL
	56573-85-4	Tributyltin	2.1 J	6.9 J	ug/kg	DSY-S-MW08-SS01	2/7	49 - 50	6.9	NA	1,800 N	NA	No	BSL

TABLE 2.10
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Value is for pyrene.
- 9 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 10 - Value is for chlordane.
- 11 - Value is for hexavalent chromium.
- 12 - Value is for mercuric chloride (and other mercury salts).
- 13 - Value is for dibutyltin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-S-MW08-SS01
 DSY-S-MW09-0001
 MW09TP01
 DSY-S-TP07-0001
 DSY-S-TP08-0001
 DSY-S-TP08-0001-D
 DSY-S-TP09-0001
 DSY-S-TP10-0001
 DSY-S-TP26-0001

Definitions:

C = Carcinogen
 COPC = Chemical Of Potential Concern
 J = Estimated value
 N = Noncarcinogen
 NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
 ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels
 BSL = Below COPC Screening Level
 NTX = No toxicity criteria
 NUT = Essential nutrient

TABLE 2.11
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
Former Building 234	Volatile Organic Compounds													
	71-43-2	Benzene	1 J	1 J	ug/kg	DSY-SB-06-0204	1/10	10 - 110	1	NA	1,100 C	2,500	No	BSL
	100-41-4	Ethylbenzene	66 J	66 J	ug/kg	DSY-S-TP26-0305	1/10	10 - 12	66	NA	5,400 C	71,000	No	BSL
	108-88-3	Toluene	1 J	1 J	ug/kg	DSY-SB-06-0204	1/10	10 - 110	1	NA	500,000 N	190,000	No	BSL
	540-59-0	Total 1,2-Dichloroethene	1 J	3 J	ug/kg	DSY-S-MW08-0810	2/10	10 - 110	3	NA	70,000 N	630,000	No	BSL
	1330-20-7	Total Xylenes	150	150	ug/kg	DSY-S-TP26-0305	1/10	10 - 12	150	NA	63,000 N	110,000	No	BSL
	79-01-6	Trichloroethene	3 J	3 J	ug/kg	DSY-S-MW08-0810	1/10	10 - 110	3	NA	440 N ⁽⁸⁾	13,000	No	BSL
	Semivolatile Organic Compounds													
	91-57-6	2-Methylnaphthalene	14,000	14,000	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	14,000	NA	23,000 N	123,000	No	BSL
	120-12-7	Anthracene	900 J	900 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	900	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	48 J	70 J	ug/kg	DSY-S-MW09-1012-D	2/10	340 - 3900	70	NA	150 C	900	No	BSL
	50-32-8	Benzo(a)pyrene	41 J	55 J	ug/kg	DSY-S-TP08-0406	2/10	340 - 3900	55	NA	15 C	400	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	63 J	80 J	ug/kg	DSY-S-TP08-0406	2/10	340 - 3900	80	NA	150 C	900	No	BSL
	191-24-2	Benzo(g,h,i)perylene	45 J	45 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	45	NA	170,000 N ⁽⁹⁾	800	No	BSL
	207-08-9	Benzo(k)fluoranthene	68 J	68 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	68	NA	1,500 C	900	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	22,000	22,000	ug/kg	DSY-S-TP08-0910	1/10	340 - 3900	22,000	NA	35,000 C	46,000	No	BSL
	218-01-9	Chrysene	41 J	54 J	ug/kg	DSY-S-MW09-1012, DSY-S-TP08-0406	2/10	340 - 3900	54	NA	15,000 C	400	No	BSL
	84-74-2	di-n-Butyl Phthalate	50 J	50 J	ug/kg	DSY-SB-04-0406	1/10	340 - 3900	50	NA	610,000 N	NA	No	BSL
	206-44-0	Fluoranthene	100 J	130 J	ug/kg	DSY-S-MW09-1012, DSY-S-MW09-1012-D	3/10	360 - 3900	130	NA	230,000 N	20,000	No	BSL
	86-73-7	Fluorene	2,100 J	2,100 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	2,100	NA	230,000 N	28,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	41 J	41 J	ug/kg	DSY-S-TP08-0406	1/10	340 - 3900	41	NA	150 C	900	No	BSL
	91-20-3	Naphthalene	2,200 J	2,200 J	ug/kg	DSY-S-TP26-0305	1/10	340 - 3600	2,200	NA	3,600 C	54,000	No	BSL
	85-01-8	Phenanthrene	51 J	4,800	ug/kg	DSY-S-TP26-0305	4/10	360 - 3600	4,800	NA	170,000 N ⁽⁹⁾	40,000	No	BSL
	129-00-0	Pyrene	87 J	460 J	ug/kg	DSY-S-TP26-0305	4/10	360 - 3600	460	NA	170,000 N	13,000	No	BSL
	Pesticides/PCBs													
	76-44-8	Heptachlor	4	4	ug/kg	DSY-S-TP26-0305	1/10	1.7 - 2.5	4	NA	110 C	NA	No	BSL
	Metals													
	7429-90-5	Aluminum	1,690	23,300	mg/kg	DSY-S-TP09-0910	16/16	-	23,300	13.075	7,700 N	NA	Yes	ASL
	7440-38-2	Arsenic	1.2 J	42	mg/kg	DSY-S-TP26-0406	15/16	3.5 - 3.5	42	20	0.39 C	7	Yes	ASL
	7440-39-3	Barium	3.1 J	33.6	mg/kg	DSY-S-TP26-0910	16/16	-	33.6	36	1,500 N	5,500	No	BSL, BKG
	7440-41-7	Beryllium	0.2 J	0.67	mg/kg	DSY-S-TP08-0406	11/16	0.17 - 0.23	0.67	0.64	16 N	1.5	No	BSL
	7440-43-9	Cadmium	0.66 J	0.66 J	mg/kg	DSY-S-TP10-1213	1/16	0.51 - 0.69	0.66	0.23	7 N	39	No	BSL
	7440-70-2	Calcium	322 J	5,190	mg/kg	DSY-S-MW09-3638	16/16	-	5,190	1,689	NA	NA	No	NUT
	7440-47-3	Chromium	2.2 J	60.2	mg/kg	DSY-SB-06-0204	16/16	-	60.2	18	0.29 C ⁽¹⁰⁾	390 ⁽¹⁰⁾	Yes	ASL
	7440-48-4	Cobalt	1.1 J	25	mg/kg	DSY-S-TP09-0910	15/16	3.9 - 3.9	25	17	2.3 N	NA	Yes	ASL
	7440-50-8	Copper	4.1	46.1	mg/kg	DSY-S-TP08-0406	16/16	-	46.1	24	310 N	3,100	No	BSL
	7439-89-6	Iron	4,060	50,000	mg/kg	DSY-S-TP09-0910	16/16	-	50,000	39.173	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	1.5 J	75 J	mg/kg	DSY-S-TP26-0406	15/16	1.3 - 1.3	75	12	400	150	No	BSL
	7439-95-4	Magnesium	534	8,600	mg/kg	DSY-S-TP09-0910	16/16	-	8,600	3.811	NA	NA	No	NUT
	7439-96-5	Manganese	78.6 J	2,450	mg/kg	DSY-S-TP09-0910	16/16	-	2,450	1,037	180 N	390	Yes	ASL
	7439-97-6	Mercury	0.06	0.06	mg/kg	DSY-S-TP26-0406	1/16	0.05 - 0.06	0.06	0.012	2.3 N ⁽¹¹⁾	23	No	BSL
	7440-02-0	Nickel	2.3 J	48.1	mg/kg	DSY-S-TP09-0910	15/16	7.2 - 7.2	48.1	28	150 N	1,000	No	BSL
	Metals (Continued)													
	7440-09-7	Potassium	108	593	mg/kg	DSY-S-MW09-2022	16/16	-	593	1,699	NA	NA	No	NUT, BKG
	7782-49-2	Selenium	0.81 J	1.4 J	mg/kg	DSY-S-TP09-0406	2/16	0.68 - 0.92	1.4	0.286	39 N	390	No	BSL
	7440-22-4	Silver	1.6 J	1.6 J	mg/kg	DSY-S-TP09-0910	1/16	1 - 1.4	1.6	0.12	39 N	200	No	BSL
	7440-23-5	Sodium	14.5 J	353	mg/kg	DSY-S-TP08-0910	9/15	17 - 68.8	353	83	NA	NA	No	NUT
	7440-62-2	Vanadium	4.4 J	19.6 J	mg/kg	DSY-S-TP09-0406	16/16	-	19.6	23	39 N	550	No	BSL, BKG
	7440-66-6	Zinc	10 J	158	mg/kg	DSY-S-TP08-0406	16/16	-	158	66	2,300 N	6,000	No	BSL
	Miscellaneous Parameters													
	1461-25-2	Tetrabutyltin	2.9 J	2.9 J	ug/kg	DSY-S-TP08-0910	1/10	49 - 50	2.9	NA	1,800 N ⁽¹²⁾	NA	No	BSL

**TABLE 2.11
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND**

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Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.
- 9 - Value is for pyrene.
- 10 - Value is for hexavalent chromium.
- 11 - Value is for mercuric chloride (and other mercury salts).
- 12 - Value is for dibutyltin and tributyltin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-S-MW08-0810	DSY-S-TP08-0910
DSY-S-MW09-1012	DSY-S-TP09-0406
DSY-S-MW09-1012-D	DSY-S-TP09-0910
DSY-S-MW09-2022	DSY-S-TP10-0507
DSY-S-MW09-3032	DSY-S-TP10-1213
DSY-S-MW09-3638	DSY-S-TP26-0305
DSY-SB-04-0406	DSY-S-TP26-0406
DSY-SB-06-0204	DSY-S-TP26-0910
DSY-S-TP08-0406	

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Former Building 234	Volatile Organic Compounds														
	75-35-4	1,1-Dichloroethene	0.25 J	0.25 J	ug/L	DSY-GW-MW08-030111	1/4	10 - 10	0.25	NA	26 N	7 7	EPA-MCL RIDE M	No	BSL
	156-59-2	cis-1,2-Dichloroethene	12.7	12.7	ug/L	DSY-GW-MW08-030111	1/1	-	12.7	NA	2.8 N	70 70	EPA-MCL RIDE M	Yes	ASL
	79-01-6	Trichloroethene	3 J	4 J	ug/L	DSY-A-MW08-01	3/4	10 - 10	4	NA	0.26 N ⁽⁷⁾	5 5	EPA-MCL RIDE M	Yes	ASL
	75-69-4	Trichlorofluoromethane	0.581 J	0.581 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.581	NA	110 N	NA NA	NA NA	No	BSL
	75-01-4	Vinyl Chloride	0.263 J	100	ug/L	DSY-A-MW104-01	2/4	10 - 10	100	NA	0.015 C	2 2	EPA-MCL RIDE M	Yes	ASL
	Metals (Total)														
	7429-90-5	Aluminum	53.7	1,010	ug/L	DSY-A-MW09-01	2/4	33.7 - 102	1,010	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	Yes	ASL
	7440-38-2	Arsenic	1.32 J	19.8	ug/L	DSY-A-MW104-01	3/4	4 - 4	19.8	NA	0.045 C	10 10	EPA-MCL RIDE M	Yes	ASL
	7440-39-3	Barium	17	99.3	ug/L	DSY-A-MW09-01	3/4	11.5 - 33.9	99.3	NA	290 N	2,000 2,000	EPA-MCL RIDE M	No	BSL
	7440-43-9	Cadmium	0.286 J	0.286 J	ug/L	DSY-GW-MW08-030111	1/4	3 - 3	0.286	NA	0.69 N	5 5	EPA-MCL RIDE M	No	BSL
	7440-70-2	Calcium	28,400	46,900	ug/L	DSY-A-MW104-01	4/4	-	46,900	NA	NA	NA NA	NA NA	No	NUT
	7440-47-3	Chromium	7.2 J	57.6 J	ug/L	DSY-A-MW09-01	3/4	1 - 1	57.6	NA	0.031 C	100 100	EPA-MCL RIDE M	Yes	ASL
	7440-48-4	Cobalt	1.74 J	1.74 J	ug/L	DSY-GW-MW08-030111	1/4	3.4 - 18.5	1.74	NA	0.47 N	NA NA	NA NA	Yes	ASL
	7440-50-8	Copper	1.57 J	12.7	ug/L	DSY-A-MW104-01	3/4	5 - 5	12.7	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
	7439-89-6	Iron	459	5,660	ug/L	DSY-A-MW08-01	4/4	140 - 140	5,660	NA	1,100 N	300 NA	EPA-SDWR NA	Yes	ASL
	7439-92-1	Lead	14.6	14.6	ug/L	DSY-A-MW104-01	1/4	0.75 - 1	14.6	NA	NA	15 15	EPA-MCL RIDE M	No	BSL
	7439-95-4	Magnesium	6,530	13,400	ug/L	DSY-A-MW08-01-D	4/4	-	13,400	NA	NA	NA NA	NA NA	No	NUT
	7439-96-5	Manganese	20.5	4,300	ug/L	DSY-A-MW104-01	4/4	-	4,300	NA	32 N	50 NA	EPA-SDWR NA	Yes	ASL
	7440-02-0	Nickel	2.08 J	2.08 J	ug/L	DSY-GW-MW08-030111	1/4	9 - 34.6	2.08	NA	30 N	NA 100	NA RIDE M	No	BSL
	7440-09-7	Potassium	1,440	7,650	ug/L	DSY-A-MW09-01	4/4	-	7,650	NA	NA	NA NA	NA NA	No	NUT
	7440-23-5	Sodium	32,000	119,000	ug/L	DSY-A-MW104-01	4/4	-	119,000	NA	NA	NA NA	NA NA	No	NUT
	7440-66-6	Zinc	29.8 J	29.8 J	ug/L	DSY-GW-MW08-030111	1/4	14.2 - 52.1	29.8	NA	470 N	5,000 NA	EPA-SDWR NA	No	BSL
	Metals (Dissolved)														
	7429-90-5	Aluminum	36.6 J	36.6 J	ug/L	DSY-GW-MW08-030111	1/1	-	36.6	NA	1,600 N	50 - 200 NA	EPA-SDWR NA	No	BSL
	7440-38-2	Arsenic	1.37 J	1.37 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.37	NA	0.045 C	10 10	EPA-MCL RIDE M	Yes	ASL
	7440-39-3	Barium	16.1	16.1	ug/L	DSY-GW-MW08-030111	1/1	-	16.1	NA	290 N	2,000 2,000	EPA-MCL RIDE M	No	BSL
	7440-43-9	Cadmium	0.274 J	0.274 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.274	NA	0.69 N	5 5	EPA-MCL RIDE M	No	BSL
	7440-70-2	Calcium	47,800	47,800	ug/L	DSY-GW-MW08-030111	1/1	-	47,800	NA	NA	NA NA	NA NA	No	NUT
	7440-48-4	Cobalt	1.78 J	1.78 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.78	NA	0.47 N	NA NA	NA NA	Yes	ASL
	7440-50-8	Copper	1.17 J	1.17 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.17	NA	62 N	1,300 NA	EPA-SDWR NA	No	BSL
Metals (Dissolved) (Continued)															

**TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND**

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Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Adjusted USEPA RSL Tapwater ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
	7439-89-6	Iron	423	423	ug/L	DSY-GW-MW08-030111	1/1	-	423	NA	1,100 N	300	EPA-SDWR	Yes	ASL
												NA	NA		
	7439-95-4	Magnesium	9,790	9,790	ug/L	DSY-GW-MW08-030111	1/1	-	9,790	NA	NA	NA	NA	No	NUT
												NA	NA		
	7439-96-5	Manganese	531	531	ug/L	DSY-GW-MW08-030111	1/1	-	531	NA	32 N	50	EPA-SDWR	Yes	ASL
												NA	NA		
	7440-02-0	Nickel	1.75 J	1.75 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.75	NA	30 N	NA	NA	No	BSL
												100	RIDEM		
7440-09-7	Potassium	5,010	5,010	ug/L	DSY-GW-MW08-030111	1/1	-	5,010	NA	NA	NA	NA	NA	No	NUT
7440-23-5	Sodium	114,000	114,000	ug/L	DSY-GW-MW08-030111	1/1	-	114,000	NA	NA	NA	NA	NA	No	NUT
7440-66-6	Zinc	16.6	16.6	ug/L	DSY-GW-MW08-030111	1/1	-	16.6	NA	470 N	5,000	EPA-SDWR	NA	No	BSL
Miscellaneous Parameters															
--	Monobutyltin	0.16 J	0.16 J	ug/L	DSY-A-MW08-01-D	1/3	1 - 1	0.16	NA	NA	NA	NA	NA	No	NTX

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - No background data is available for groundwater.
- 5 - USEPA Regional Screening Level (RSL). The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag), May 2012.
- 6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-A-MW08-01
DSY-A-MW08-01-D
DSY-A-MW09-01
DSY-A-MW104-01
DSY-GW-MW08-030111

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level (USEPA, 2012)
EPA-SDWR = US Environmental Protection Agency Secondary Drinking Water Regulation (USEPA, 2012)
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
RIDEM = Rhode Island Department of Environmental Management GA Groundwater Objective (February, 2004).

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level/ARAR/TBC

For elimination as a COPC:
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 2.13
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION (GROUNDWATER TO INDOOR AIR) - FORMER BUILDING 234
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Above Background Concentration? ⁽⁴⁾	Vapor Intrusion Criteria ⁽⁵⁾	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁶⁾
Former Building 234	Volatile Organic Compounds														
	75-35-4	1,1-Dichloroethene	0.25 J	0.25 J	ug/L	DSY-GW-MW08-030111	1/4	10 - 10	0.25	NA	20 N	NA	NA	No	BSL
	156-59-2	cis-1,2-Dichloroethene	12.7	12.7	ug/L	DSY-GW-MW08-030111	1/1	-	12.7	NA	NA	NA	NA	No	NTX
	79-01-6	Trichloroethene	3 J	4 J	ug/L	DSY-A-MW08-01	3/4	10 - 10	4	NA	0.52 N ⁽⁷⁾	NA	NA	Yes	ASL
	75-69-4	Trichlorofluoromethane	0.581 J	0.581 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.581	NA	18 N	NA	NA	No	BSL
	75-01-4	Vinyl Chloride	0.263 J	100	ug/L	DSY-A-MW104-01	2/4	10 - 10	100	NA	0.14 C	NA	NA	Yes	ASL
	Metals														
	7429-90-5	Aluminum	53.7	1,010	ug/L	DSY-A-MW09-01	2/4	33.7 - 102	1,010	NA	NA	NA	NA	No	NTX
	7440-38-2	Arsenic	1.32 J	19.8	ug/L	DSY-A-MW104-01	3/4	4 - 4	19.8	NA	NA	NA	NA	No	NTX, BKG
	7440-39-3	Barium	17	99.3	ug/L	DSY-A-MW09-01	3/4	11.5 - 33.9	99.3	NA	NA	NA	NA	No	NTX
	7440-43-9	Cadmium	0.286 J	0.286 J	ug/L	DSY-GW-MW08-030111	1/4	3 - 3	0.286	NA	NA	NA	NA	No	NTX
	7440-70-2	Calcium	28,400	46,900	ug/L	DSY-A-MW104-01	4/4	-	46,900	NA	NA	NA	NA	No	NUT
	7440-47-3	Chromium	7.2 J	57.6 J	ug/L	DSY-A-MW09-01	3/4	1 - 1	57.6	NA	NA	NA	NA	No	NTX
	7440-48-4	Cobalt	1.74 J	1.74 J	ug/L	DSY-GW-MW08-030111	1/4	3.4 - 18.5	1.74	NA	NA	NA	NA	No	NTX
	7440-50-8	Copper	1.57 J	12.7	ug/L	DSY-A-MW104-01	3/4	5 - 5	12.7	NA	NA	NA	NA	No	NTX
	7439-89-6	Iron	459	5,660	ug/L	DSY-A-MW08-01	4/4	140 - 140	5,660	NA	NA	NA	NA	No	NTX
	7439-92-1	Lead	14.6	14.6	ug/L	DSY-A-MW104-01	1/4	0.75 - 1	14.6	NA	NA	NA	NA	No	NTX
	7439-95-4	Magnesium	6,530	13,400	ug/L	DSY-A-MW08-01-D	4/4	-	13,400	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	20.5	4,300	ug/L	DSY-A-MW104-01	4/4	-	4,300	NA	NA	NA	NA	No	NTX
	7440-02-0	Nickel	2.08 J	2.08 J	ug/L	DSY-GW-MW08-030111	1/4	9 - 34.6	2.08	NA	NA	NA	NA	No	NTX
	7440-09-7	Potassium	1,440	7,650	ug/L	DSY-A-MW09-01	4/4	-	7,650	NA	NA	NA	NA	No	NUT
	7440-23-5	Sodium	32,000	119,000	ug/L	DSY-A-MW104-01	4/4	-	119,000	NA	NA	NA	NA	No	NUT
	7440-66-6	Zinc	29.6 J	29.8 J	ug/L	DSY-GW-MW08-030111	1/4	14.2 - 52.1	29.8	NA	NA	NA	NA	No	NTX
	Dissolved Metals														
	7429-90-5	Aluminum	36.6 J	36.6 J	ug/L	DSY-GW-MW08-030111	1/1	-	36.6	NA	NA	NA	NA	No	NTX
	7440-38-2	Arsenic	1.37 J	1.37 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.37	NA	NA	NA	NA	No	NTX, BKG
	7440-39-3	Barium	16.1	16.1	ug/L	DSY-GW-MW08-030111	1/1	-	16.1	NA	NA	NA	NA	No	NTX
	7440-43-9	Cadmium	0.274 J	0.274 J	ug/L	DSY-GW-MW08-030111	1/1	-	0.274	NA	NA	NA	NA	No	NTX
	7440-70-2	Calcium	47,800	47,800	ug/L	DSY-GW-MW08-030111	1/1	-	47,800	NA	NA	NA	NA	No	NUT
	7440-48-4	Cobalt	1.78 J	1.78 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.78	NA	NA	NA	NA	No	NTX
	7440-50-8	Copper	1.17 J	1.17 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.17	NA	NA	NA	NA	No	NTX
	7439-89-6	Iron	423	423	ug/L	DSY-GW-MW08-030111	1/1	-	423	NA	NA	NA	NA	No	NTX
	7439-95-4	Magnesium	9,790	9,790	ug/L	DSY-GW-MW08-030111	1/1	-	9,790	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	531	531	ug/L	DSY-GW-MW08-030111	1/1	-	531	NA	NA	NA	NA	No	NTX
	7440-02-0	Nickel	1.75 J	1.75 J	ug/L	DSY-GW-MW08-030111	1/1	-	1.75	NA	NA	NA	NA	No	NTX
	7440-09-7	Potassium	5,010	5,010	ug/L	DSY-GW-MW08-030111	1/1	-	5,010	NA	NA	NA	NA	No	NUT
	7440-23-5	Sodium	114,000	114,000	ug/L	DSY-GW-MW08-030111	1/1	-	114,000	NA	NA	NA	NA	No	NUT
	7440-66-6	Zinc	16.6	16.6	ug/L	DSY-GW-MW08-030111	1/1	-	16.6	NA	NA	NA	NA	No	NTX
	Miscellaneous Parameters														
	- -	Monobutyltin	0.16 J	0.16 J	ug/L	DSY-A-MW08-01-D	1/3	1 - 1	0.16	NA	NA	NA	NA	No	NTX

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - No background data is available for groundwater.
- 5 - USEPA Vapor Intrusion Screening Level (VISL) Calculator, Version 2.0. May 2012 RSLs.
Values correspond to a target cancer risk level of 1E-6 or HI = 0.1 and an attenuation factor of 0.001.
- 6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 7 - Ten percent of noncarcinogenic screening level is less than the carcinogenic screening level, therefore the noncarcinogenic value is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-A-MW08-01
DSY-A-MW08-01-D
DSY-A-MW09-01

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
J = Estimated value
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:

ASL = Above Screening Level.

For elimination as a COPC:

BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 2.14
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - SOUTH WATERFRONT
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
South Waterfront	Polycyclic Aromatic Hydrocarbons													
	205-99-2	Benzo(b)fluoranthene	43 J	43 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	43	NA	150 C	900	No	BSL
	206-44-0	Fluoranthene	59 J	59 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	59	NA	230,000 N	20,000	No	BSL
	129-00-0	Pyrene	67 J	67 J	ug/kg	DSY-S-TP01-1112	1/3	3.61 - 3.66	67	NA	170,000 N	13,000	No	BSL
	Metals													
	7429-90-5	Aluminum	5,860	17,400	mg/kg	DSY-SB201-SO-0204	6/6	-	17400	13075	7,700 N	NA	Yes	ASL
	7440-38-2	Arsenic	7.7 J	26.3	mg/kg	DSY-SB202-SO-0204	6/6	-	26.3	20	0.39 C	7	Yes	ASL
	7440-39-3	Barium	13.9	18 J	mg/kg	DSY-S-TP02-1516	5/6	2.9 - 2.9	18	36	1,500 N	5,500	No	BSL, BKG
	7440-41-7	Beryllium	0.34 J	0.418 J	mg/kg	DSY-SB201-SO-0204	5/6	0.21 - 0.21	0.418	0.64	16 N	1.5	No	BSL, BKG
	7440-43-9	Cadmium	0.56 J	0.56 J	mg/kg	DSY-S-TP06-1213	1/6	0.214 - 0.63	0.56	0.23	7 N	39	No	BSL
	7440-70-2	Calcium	812	3,490	mg/kg	DSY-S-TP02-1516	6/6	-	3490	1689	NA	NA	No	NUT
	7440-47-3	Chromium	6.6 J	21.2	mg/kg	DSY-SB201-SO-0204	6/6	-	21.2	18	0.29 C ⁽⁸⁾	390 ⁽⁶⁾	Yes	ASL
	7440-48-4	Cobalt	4.4 J	29.9	mg/kg	DSY-S-TP05-1213	6/6	-	29.9	17	2.3 N	NA	Yes	ASL
	7440-50-8	Copper	7 J	29.9 J	mg/kg	DSY-SB201-SO-0204	6/6	-	29.9	24	310 N	3,100	No	BSL
	7439-89-6	Iron	16,800	45,500	mg/kg	DSY-SB202-SO-0204	6/6	-	45500	39173	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	7.6 J	34.2 J	mg/kg	DSY-S-TP02-1516	6/6	-	34.2	12	400	150	No	BSL
	7439-95-4	Magnesium	2,230	5,220	mg/kg	DSY-SB201-SO-0204	6/6	-	5220	3811	NA	NA	No	NUT
	7439-96-5	Manganese	104 J	800	mg/kg	DSY-S-TP05-1213	6/6	-	800	1,037	180 N	390	No	BKG
	7440-02-0	Nickel	10.7 J	38.6	mg/kg	DSY-SB201-SO-0204	6/6	-	38.6	28	150 N	1,000	No	BSL
	7440-09-7	Potassium	121 J	365	mg/kg	DSY-S-TP05-1213	6/6	-	365	1,699	NA	NA	No	NUT, BKG
	7440-23-5	Sodium	9 J	23 J	mg/kg	DSY-S-TP05-1213	2/6	36.7 - 342	23	83	NA	NA	No	NUT, BKG
	7440-62-2	Vanadium	9	18.6	mg/kg	DSY-SB201-SO-0204	6/6	-	18.6	23	39 N	550	No	BSL, BKG
	7440-66-6	Zinc	52.5 J	75.7 J	mg/kg	DSY-SB202-SO-0204	6/6	-	75.7	66	2,300 N	6,000	No	BSL

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
 - 2 - Values presented are sample-specific quantitation limits.
 - 3 - The maximum detected concentration is used for screening purposes.
 - 4 - Background concentration is upper prediction limit. See Appendix G.
 - 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
 - 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
 - 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
 - 8 - Value is for hexavalent chromium.
- Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-SB201-SO-0204
DSY-SB202-SO-0204
DSY-S-TP01-1112
DSY-S-TP02-1516
DSY-S-TP05-1213
DSY-S-TP06-1213

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

TABLE 2.15
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
PCB Removal Area	Polycyclic Aromatic Hydrocarbons													
	91-57-6	2-Methylnaphthalene	18.8 J	299	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	299	NA	23,000 N	123,000	No	BSL
	83-32-9	Acenaphthene	10 J	1,000	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	1,000	NA	340,000 N	43,000	No	BSL
	208-96-8	Acenaphthylene	695	695	ug/kg	DSY-SO-SB209-0.30.7	1/3	3.94 - 360	695	NA	340,000 N ⁽⁸⁾	23,000	No	BSL
	120-12-7	Anthracene	45.1 J	2,290	ug/kg	DSY-SO-SB209-0.30.7	2/3	3.94 - 360	2,290	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	42 J	5,740	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	5,740	NA	150 C	900	Yes	ASL
	50-32-8	Benzo(a)pyrene	46.3 J	4,920	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	4,920	NA	15 C	400	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	50 J	7,120	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	7,120	NA	150 C	900	Yes	ASL
	191-24-2	Benzo(g,h,i)perylene	28.4 J	2,070	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,070	NA	170,000 N ⁽⁹⁾	800	Yes	ASL
	207-08-9	Benzo(k)fluoranthene	28.8 J	2,480	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,480	NA	1,500 C	900	Yes	ASL
	218-01-9	Chrysene	45 J	5,650	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	5,650	NA	15,000 C	400	Yes	ASL
	53-70-3	Dibenzo(a,h)anthracene	10.1 J	820	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	820	NA	15 C	400	Yes	ASL
	206-44-0	Fluoranthene	82 J	13,400	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	13,400	NA	230,000 N	20,000	No	BSL
	86-73-7	Fluorene	6.3 J	1,220	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	1,220	NA	230,000 N	28,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	23.5 J	2,070	ug/kg	DSY-SO-SB209-0.30.7	3/3	-	2,070	NA	150 C	900	Yes	ASL
	91-20-3	Naphthalene	14.7 J	751	ug/kg	DSY-SO-SB209-0.30.7	2/3	360 - 360	751	NA	3,600 C	54,000	No	BSL
	85-01-8	Phenanthrene	60 J	9,530	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	9,530	NA	170,000 N ⁽⁸⁾	40,000	No	BSL
	129-00-0	Pyrene	58 J	10,100	ug/kg	DSY-SO-SB209-0.30.7	4/4	-	10,100	NA	170,000 N	13,000	No	BSL
	Pesticides/PCBs													
	11096-82-5	Aroclor-1260	24.2 J	416 J	ug/kg	DSY-SO-SB209-0.30.7	2/7	17.2 - 36	416	NA	220 C	NA	Yes	ASL
	1336-36-3	Total Aroclors	24.2 J	416 J	ug/kg	DSY-SO-SB209-0.30.7	2/6	17.2 - 18.1	416	NA	220 C	10,000	Yes	ASL
	Metals													
	7429-90-5	Aluminum	9,120	12,300	mg/kg	DSY-S-MW06-SS01	3/3	-	12,300	16,020	7,700 N	NA	No	BKG
	7440-38-2	Arsenic	10.4	21.8 J	mg/kg	DSY-SO-SB208-000.5	4/4	-	21.8	13	0.39 C	7	Yes	ASL
	7440-39-3	Barium	14.8 J	35.4 J	mg/kg	DSY-SO-SB208-000.5-D	4/4	-	35.4	51	1,500 N	5,500	No	BSL, BKG
	7440-41-7	Beryllium	0.45	0.576	mg/kg	DSY-SO-SB208-000.5-D	3/3	-	0.576	0.58	16 N	1.5	No	BSL, BKG
	7440-43-9	Cadmium	0.232 J	1.4	mg/kg	B6-S1	2/4	0.122 - 0.61	1.4	0.17	7 N	39	No	BSL
	7440-70-2	Calcium	416 J	1,180	mg/kg	DSY-S-MW06-SS01	3/3	-	1,180	1,598	NA	NA	No	NUT, BKG
	7440-47-3	Chromium	10 J	15.8 J	mg/kg	DSY-S-MW06-SS01	4/4	-	15.8	16	0.29 C ⁽¹⁰⁾	390 ⁽¹⁰⁾	No	BKG
	7440-48-4	Cobalt	8.62 J	22.7	mg/kg	DSY-S-MW06-SS01	3/3	-	22.7	9	2.3 N	NA	Yes	ASL
	7440-50-8	Copper	23.4 J	33.5 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	-	33.5	12.4	310 N	3,100	No	BSL
	7439-89-6	Iron	22,500	32,000	mg/kg	DSY-SO-SB208-000.5	3/3	-	32,000	24,200	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	16.4 J	26.5 J	mg/kg	DSY-SO-SB209-0.30.7	4/4	-	26.5	40	400	150	No	BSL, BKG
	7439-95-4	Magnesium	2,840	4,090	mg/kg	DSY-S-MW06-SS01	3/3	-	4,090	2,571	NA	NA	No	NUT
	7439-96-5	Manganese	293	619	mg/kg	DSY-S-MW06-SS01	3/3	-	619	349	180 N	390	Yes	ASL
	7439-97-6	Mercury	0.0168 J	0.0247 J	mg/kg	DSY-SO-SB208-000.5	2/3	0.0359 - 0.05	0.0247	0.18	2.3 N ⁽¹¹⁾	23	No	BSL, BKG
	7440-02-0	Nickel	21.1	26.3	mg/kg	DSY-SO-SB208-000.5-D	3/3	-	26.3	15	150 N	1,000	No	BSL
	7440-09-7	Potassium	282	394 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	904 - 904	394	651	NA	NA	No	NUT, BKG
	7782-49-2	Selenium	0.301 J	0.631	mg/kg	DSY-SO-SB208-000.5-D	2/3	0.82 - 1.51	0.631	0.57	39 N	390	No	BSL
	7440-23-5	Sodium	71.4 J	71.4 J	mg/kg	DSY-SO-SB209-0.30.7	1/2	182 - 904	71.4	231	NA	NA	No	NUT, BKG
	7440-62-2	Vanadium	14.2	25.1	mg/kg	DSY-SO-SB208-000.5	3/3	-	25.1	34	39 N	550	No	BSL, BKG
	7440-66-6	Zinc	75.5 J	137 J	mg/kg	DSY-SO-SB209-0.30.7	3/3	-	137	62	2,300 N	6,000	No	BSL

TABLE 2.15
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Value is for acenaphthene.
- 9 - Value is for pyrene.
- 10 - Value is for hexavalent chromium.
- 11 - Value is for mercuric chloride (and other mercury salts).

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-S-MW06-SS01
 DSY-SO-SB208-000.5
 DSY-SO-SB208-000.5-D
 DSY-SO-SB209-0.30.7
 DSY-SO-SB215-000.5
 DSY-SO-SB216-000.5
 DSY-SO-SB217-000.5
 DSY-SO-SB224-000.5
 DSY-SO-SB224-000.5-D
 B6-S1

Definitions:

C = Carcinogen
 COPC = Chemical Of Potential Concern
 J = Estimated value
 N = Noncarcinogen
 NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
 ASL = Above Screening Level.

For elimination as a COPC:
 BKG = Within Background Levels
 BSL = Below COPC Screening Level
 NTX = No toxicity criteria
 NUT = Essential nutrient

TABLE 2.16
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration ⁽¹⁾	Maximum Concentration ⁽¹⁾	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects ⁽²⁾	Concentration Used for Screening ⁽³⁾	Background Concentration ⁽⁴⁾	Adjusted USEPA RSL Residential Soil ⁽⁵⁾	RIDEM Residential Direct Exposure Criteria ⁽⁶⁾	COPC Flag	Rationale for Contaminant Deletion or Selection ⁽⁷⁾
PCB Removal Area	Polycyclic Aromatic Hydrocarbons													
	91-57-6	2-Methylnaphthalene	3.38 J	281	ug/kg	DSY-SO-SB214-0203	3/6	3.83 - 360	281	NA	23,000 N	123,000	No	BSL
	83-32-9	Acenaphthene	2.87 J	2.87 J	ug/kg	DSY-SO-SB213-0203	1/6	3.53 - 360	2.87	NA	340,000 N	43,000	No	BSL
	208-96-8	Acenaphthylene	3.5 J	47.2	ug/kg	DSY-SO-SB214-0203	4/6	3.9 - 360	47.2	NA	340,000 N ⁽⁸⁾	23,000	No	BSL
	120-12-7	Anthracene	4.71 J	17.2	ug/kg	DSY-SO-SB212-0204	3/6	4.11 - 360	17.2	NA	1,700,000 N	35,000	No	BSL
	56-55-3	Benzo(a)anthracene	32.5	252	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	252	NA	150 C	900	Yes	ASL
	50-32-8	Benzo(a)pyrene	18.9	172	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	172	NA	15 C	400	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	26.6	336	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	336	NA	150 C	900	Yes	ASL
	191-24-2	Benzo(g,h,i)perylene	10.7 J	91.1	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	91.1	NA	170,000 N ⁽⁹⁾	800	No	BSL
	207-08-9	Benzo(k)fluoranthene	11.3 J	124	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	124	NA	1,500 C	900	No	BSL
	218-01-9	Chrysene	20.5	356	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	356	NA	15,000 C	400	No	BSL
	53-70-3	Dibenzo(a,h)anthracene	7.48 J	43.7	ug/kg	DSY-SO-SB214-0203	3/6	3.83 - 360	43.7	NA	15 C	400	Yes	ASL
	206-44-0	Fluoranthene	39.6	451	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	451	NA	230,000 N	20,000	No	BSL
	86-73-7	Fluorene	2.22 J	8.85 J	ug/kg	DSY-SO-SB212-0204	3/6	4.11 - 360	8.85	NA	230,000 N	28,000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	10.2 J	82.7	ug/kg	DSY-SO-SB214-0203	5/6	360 - 360	82.7	NA	150 C	900	No	BSL
	91-20-3	Naphthalene	2.5 J	175	ug/kg	DSY-SO-SB214-0203	4/6	3.9 - 360	175	NA	3,600 C	54,000	No	BSL
	85-01-8	Phenanthrene	24.8	400	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	400	NA	170,000 N ⁽⁹⁾	40,000	No	BSL
	129-00-0	Pyrene	33.9	375	ug/kg	DSY-SO-SB214-0203	6/7	360 - 360	375	NA	170,000 N	13,000	No	BSL
	Pesticides/PCBs													
	1336-36-3	Total Aroclors	95	95	ug/kg	B6-S6	1/6	17.2 - 26.9	95	NA	220 C	10,000	No	BSL
	Metals													
	7429-90-5	Aluminum	2,180	19,900	mg/kg	DSY-S-MW06-0406	6/6	-	19,900	13,075	7,700 N	NA	Yes	ASL
	7440-36-0	Antimony	1.15 J	1.15 J	mg/kg	DSY-SO-SB214-0203	1/6	0.428 - 17.6	1.15	ND	3.1 N	10	No	BSL
	7440-38-2	Arsenic	1.47 J	47.2 J	mg/kg	DSY-SO-SB214-0203	7/7	-	47.2	20	0.39 C	7	Yes	ASL
	7440-39-3	Barium	5.5 J	57.7 J	mg/kg	DSY-SO-SB214-0203	6/6	-	57.7	36	1,500 N	5,500	No	BSL
	7440-41-7	Beryllium	0.507 J	0.759	mg/kg	DSY-SO-SB214-0203	5/6	0.34 - 0.34	0.759	0.64	16 N	1.5	No	BSL
	7440-43-9	Cadmium	0.0903 J	1.4	mg/kg	B6-S6	2/7	0.107 - 1	1.4	0.23	7 N	39	No	BSL
	7440-70-2	Calcium	279 J	2,040 J	mg/kg	DSY-SO-SB214-0203	6/6	-	2,040	1,689	NA	NA	No	NUT
	7440-47-3	Chromium	0.788 J	25.6 J	mg/kg	DSY-S-MW06-0406	7/7	-	25.6	18	0.29 C ⁽¹⁰⁾	390 ⁽¹⁰⁾	Yes	ASL
	7440-48-4	Cobalt	1.29 J	24	mg/kg	DSY-S-MW06-0406	6/6	-	24	17	2.3 N	NA	Yes	ASL
	7440-50-8	Copper	1.67 J	39.5 J	mg/kg	DSY-SO-SB214-0203	6/6	-	39.5	24	310 N	3,100	No	BSL
	7439-89-6	Iron	6,800	43,600	mg/kg	DSY-S-MW06-0406	6/6	-	43,600	39,173	5,500 N	NA	Yes	ASL
	7439-92-1	Lead	2.49 J	81.4 J	mg/kg	DSY-SO-SB214-0203	7/7	-	81.4	12	400	150	No	BSL
	7439-95-4	Magnesium	646	7,130	mg/kg	DSY-S-MW06-0406	6/6	-	7,130	3,811	NA	NA	No	NUT
	7439-96-5	Manganese	305	1,190	mg/kg	DSY-SO-SB214-0203	6/6	-	1,190	1,037	180 N	390	Yes	ASL
	7439-97-6	Mercury	0.0138 J	0.0603	mg/kg	DSY-SO-SB214-0203	3/6	0.0276 - 0.05	0.0603	0.012	2.3 N ⁽¹¹⁾	23	No	BSL
	7440-02-0	Nickel	0.596	39.7	mg/kg	DSY-S-MW06-0406	6/6	-	39.7	28	150 N	1,000	No	BSL
	7440-09-7	Potassium	166	681 J	mg/kg	DSY-SO-SB212-0204	6/6	-	681	1,699	NA	NA	No	NUT, BKG
	7782-49-2	Selenium	0.67	1.31	mg/kg	DSY-SO-SB214-0203	2/6	0.268 - 1.49	1.31	0.286	39 N	390	No	BSL
	7440-23-5	Sodium	90.6 J	90.6 J	mg/kg	DSY-SO-SB214-0203	1/5	161 - 179	90.6	83	NA	NA	No	NUT
	7440-62-2	Vanadium	3.97	20.6	mg/kg	DSY-SO-SB213-0203	6/6	-	20.6	23	39 N	550	No	BSL, BKG
	7440-66-6	Zinc	27.1 J	335 J	mg/kg	DSY-SO-SB214-0203	6/6	-	335	66	2,300 N	6,000	No	BSL

TABLE 2.16
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - PCB REMOVAL AREA
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

Footnotes:

- 1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
- 2 - Values presented are sample-specific quantitation limits.
- 3 - The maximum detected concentration is used for screening purposes.
- 4 - Background concentration is upper prediction limit. See Appendix G.
- 5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2012. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
- 6 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, November 2011.
- 7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
- 8 - Value is for acenaphthene.
- 9 - Value is for pyrene.
- 10 - Value is for hexavalent chromium.
- 11 - Value is for mercuric chloride (and other mercury salts).

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

DSY-S-MW06-0406
DSY-SO-SB210-0102
DSY-SO-SB211-0102
DSY-SO-SB212-0204
DSY-SO-SB213-0203
DSY-SO-SB214-0203
B6-S6

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL = Above Screening Level and site background.

For elimination as a COPC:
BKG = Within Background Levels
BSL = Below COPC Screening Level
NTX = No toxicity criteria
NUT = Essential nutrient

RAGS Part D Table 3

Medium-Specific Exposure Point Concentration Summary

LIST OF TABLES
RAGS PART D TABLE 3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Table No.

3.1.RME	Unpaved Surface Soil - North Waterfront
3.2.RME	Surface Soil - North Waterfront
3.3.RME	Subsurface Soil - North Waterfront
3.4.RME	Groundwater - North Waterfront
3.5.RME	Unpaved Surface Soil - Central Shipyard
3.6.RME	Surface Soil - Central Shipyard
3.7.RME	Subsurface Soil - Central Shipyard
3.8.RME	Groundwater - Central Shipyard
3.9.RME	Unpaved Surface Soil - Former Building 234
3.10.RME	Surface Soil - Former Building 234
3.11.RME	Subsurface Soil - Former Building 234
3.12.RME	Groundwater - Former Building 234
3.13.RME	Subsurface Soil - South Waterfront
3.14.RME	Unpaved Surface Soil - PCB Removal Area
3.15.RME	Surface Soil - PCB Removal Area
3.16.RME	Subsurface Soil - PCB Removal Area

TABLE 3.1.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Unpaved North Waterfront Surface Soil	Benzo(a)anthracene	mg/kg	(1)	(1)	0.232	0.232	mg/kg	Maximum Detected Concentration	(1)
	Benzo(a)pyrene	mg/kg	(1)	(1)	0.165	0.165	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
	Benzo(b)fluoranthene	mg/kg	(1)	(1)	0.263	0.263	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
	Chrysene	mg/kg	(1)	(1)	0.238	0.238	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.124	0.124	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
	Indeno(1,2,3-cd)pyrene	mg/kg	(1)	(1)	0.099	0.099	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
	Chromium VI	mg/kg	8.73	10.8 (G)	16.1	10.8	mg/kg	95% KM (Percentile Bootstrap) UCL	ProUCL 4.1.01
	Cobalt	mg/kg	5.46	7.0 (N)	9.56	7.0	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Iron	mg/kg	15,125	18,800 (NP)	27,100	18,800	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Manganese	mg/kg	170.9	229 (N)	337	229	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma
L = Lognormal
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

TABLE 3.2.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
North Waterfront	Benzo(a)anthracene	mg/kg	0.486	0.207 (N)	0.61	0.207	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(a)pyrene	mg/kg	0.479	0.161 (N)	0.53	0.161	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(b)fluoranthene	mg/kg	0.500	0.251 (N)	0.805	0.251	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Chrysene	mg/kg	0.489	0.209 (N)	0.58	0.209	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.124	0.124	mg/kg	Maximum Detected Concentration	ProUCL 4.1.01
	Indeno(1,2,3-cd)pyrene	mg/kg	0.467	0.109 (N)	0.38	0.109	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	8.7	13.5 (G)	24.1	13.5	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.1.01
	Cobalt	mg/kg	6.5	7.9 (N)	14.7	7.9	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Iron	mg/kg	15,774	17,425 (G)	27,100	17,425	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

TABLE 3.3.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
North Waterfront	Benzo(a)pyrene	mg/kg	(1)	(1)	0.044	0.044	mg/kg	Maximum Detected Concentration	(1)
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.0233	0.0233	mg/kg	Maximum Detected Concentration	(1)
	Aluminum	mg/kg	6420	7,510 (G)	18,200	7,510	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	9.48	11.0 (G)	27.1	11	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01
	Cobalt	mg/kg	7.13	8.68 (G)	19.8	8.68	mg/kg	95% KM (BCA) UCL	ProUCL 4.1.01
	Iron	mg/kg	17,600	20,100 (G)	44,400	20,100	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

TABLE 3.4.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DEREKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
North Waterfront	cis-1,2-Dichloroethene	ug/L	1.2	2.3 (N)	4.26	4.26	ug/L	Maximum Detected Concentration	(1)
	Trichloroethene (Mutagenic)	ug/L	4.8	7.9 (N)	12.2	12.2	ug/L	Maximum Detected Concentration	(1)
	Trichloroethene (Nonmutagenic)	ug/L	4.8	7.9 (N)	12.2	12.2	ug/L	Maximum Detected Concentration	(1)
	Vinyl Chloride	ug/L	(2)	(2)	1.47	1.47	ug/L	Maximum Detected Concentration	(1)
	Aluminum	ug/L	(3)	(3)	337	337	ug/L	Maximum Detected Concentration	(1)
	Chromium VI	ug/L	(3)	(3)	0.508	0.508	ug/L	Maximum Detected Concentration	(3)
	Iron	ug/L	(3)	(3)	605	605	ug/L	Maximum Detected Concentration	(3)
	Manganese	ug/L	(3)	(3)	53.9	53.9	ug/L	Maximum Detected Concentration	(3)

G - Gamma distribution.

N - Normal distribution.

NP = Nonparametric distribution.

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

2 - The maximum detected concentration is used as the exposure point concentration for groundwater.

3 - There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

TABLE 3.5.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Unpaved Cental Shipyards	Arsenic	mg/kg	(1)	(1)	24.4	24.4	mg/kg	Maximum Detected Concentration	(1)
	Chromium VI	mg/kg	(1)	(1)	15.8	15.8	mg/kg	Maximum Detected Concentration	(1)
	Cobalt	mg/kg	(1)	(1)	14.7	14.7	mg/kg	Maximum Detected Concentration	(1)
	Iron	mg/kg	(1)	(1)	31,800	31,800	mg/kg	Maximum Detected Concentration	(1)
	Manganese	mg/kg	(1)	(1)	448	448	mg/kg	Maximum Detected Concentration	(1)

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

TABLE 3.6.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Cental Shipyard	Benzo(a)anthracene	mg/kg	0.21	0.30 (NP)	0.41	0.30	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(a)pyrene	mg/kg	0.11	0.17 (NP)	0.14	0.14	mg/kg	Maximum	(1)
	Benzo(b)fluoranthene	mg/kg	0.23	0.34 (NP)	0.41	0.34	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Chrysene	mg/kg	0.21	0.30 (NP)	0.42	0.3	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Arsenic	mg/kg	16.2	23.7 (N)	24.4	23.7	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	14.50	17.3 (N)	18.2	17.3	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Cobalt	mg/kg	12.00	14.6 (N)	14.7	14.6	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Iron	mg/kg	28,000	32,800 (NP)	32,500	32,500	mg/kg	Maximum Detected Concentration	(1)
	Manganese	mg/kg	381	435 (N)	448	435	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.
(1) Calculated 95% UCL exceeds the maximum concentration. Maximum concentration used as the EPC.

TABLE 3.7.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Cental Shipyard	Benzo(a)anthracene	mg/kg	0.294	0.278 (G)	1.30	0.278	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(a)pyrene	mg/kg	0.257	0.194 (G)	0.69	0.194	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(b)fluoranthene	mg/kg	0.282	0.247 (G)	0.91	0.247	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Chrysene	mg/kg	0.296	0.282 (L)	1.3	0.282	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.046	0.046	mg/kg	Maximum Detected Concentration	(1)
	Indeno(1,2,3-cd)pyrene	mg/kg	0.27	0.2	0.24	0.2	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Aluminum	mg/kg	9,450	10,200 (N)	14,300	10,200	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Arsenic	mg/kg	16.4	18.4 (N)	37.3	18.4	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	12.5	13.3 (N)	22	13.3	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Cobalt	mg/kg	11.1	12.3 (N)	20.2	12.3	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Iron	mg/kg	24,600	26,900 (N)	40,100	26,900	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There was only one detected concentration. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

TABLE 3.8.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DEREKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Central Shipyard	Aluminum	ug/L	(1)	(1)	312	312	ug/L	Maximum Detected Concentration	(1)
	Arsenic	ug/L	(1)	(1)	78.1 J	78.1	ug/L	Maximum Detected Concentration	(1)
	Cadmium	ug/L	(1)	(1)	1.53	1.53	ug/L	Maximum Detected Concentration	(1)
	Cobalt	ug/L	(1)	(1)	24.8	24.8	ug/L	Maximum Detected Concentration	(1)
	Iron	ug/L	(1)	(1)	65,800 J	65,800	ug/L	Maximum Detected Concentration	(1)
	Manganese	ug/L	(1)	(1)	9,100	9,100	ug/L	Maximum Detected Concentration	(1)

Notes:

1 - Only two groundwater sample was collected at the Central Shipyard in 2011 therefore statistics could not be calculated. The maximum detected concentration is used as the exposure point concentration for groundwater.

TABLE 3.9.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Unpaved Former Building 234 Surface Soil	Benzo(a)anthracene	mg/kg	0.230	0.324 (N)	0.47	0.324	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(a)pyrene	mg/kg	0.214	0.288 (N)	0.41	0.288	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(b)fluoranthene	mg/kg	0.314	0.477 (N)	0.66	0.477	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Chrysene	mg/kg	0.274	0.409 (N)	0.58	0.409	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.062	0.062	mg/kg	Maximum Detected Concentration	(1)
	Indeno(1,2,3-cd)pyrene	mg/kg	0.26	0.180 (N)	0.19	0.18	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Arsenic	mg/kg	11.9	17.9 (N)	23.6	17.9	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Beryllium	mg/kg	0.84	3.2 (G)	3.5	3.2	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.1.01
	Cadmium	mg/kg	(1)	(1)	13	13	mg/kg	Maximum Detected Concentration	(1)
	Chromium VI	mg/kg	34.00	83 (G)	130	83	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01
	Cobalt	mg/kg	12.40	20.0 (N)	23.9	20	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Iron	mg/kg	22,700	32,100 (N)	37,200	32,100	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Lead	mg/kg	53.9	135 (G)	189	53.9	mg/kg	Arithmetic Mean Concentration	(2)
	Manganese	mg/kg	366	509 (N)	597	509	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

1 There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

2 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.

U.S. EPA, 1994:Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

TABLE 3.10.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DEREKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Former Building 234	Benzo(a)anthracene	mg/kg	0.22	0.30 (N)	0.47	0.3	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(a)pyrene	mg/kg	0.21	0.27 (N)	0.41	0.27	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Benzo(b)fluoranthene	mg/kg	0.28	0.43 (N)	0.66	0.43	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Chrysene	mg/kg	0.25	0.36 (N)	0.58 J	0.36	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.062 J	0.062	mg/kg	Maximum Detected Concentration	(1)
	Indeno(1,2,3-cd)pyrene	mg/kg	0.25	0.18 (N)	0.19 J	0.18	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
	Arsenic	mg/kg	11.2	16.4 (N)	23.6	16.4	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Beryllium	mg/kg	0.75	3.7 (L)	3.5	3.5	mg/kg	Maximum Detected Concentration	(2)
	Cadmium	mg/kg	(1)	(1)	13	13	mg/kg	Maximum Detected Concentration	(1)
	Chromium VI	mg/kg	31.60	91.1 (L)	130	91.1	mg/kg	95% H-UCL	ProUCL 4.1.01
	Cobalt	mg/kg	11.80	17.8 (N)	23.9	17.8	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Iron	mg/kg	22,300	30,020 (N)	37,200	30,020	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Lead	mg/kg	53.6	115 (G)	189 J	53.6	mg/kg	Arithmetic Mean	(3)
	Manganese	mg/kg	356	474 (N)	597	474	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

2 - The calculated 95% UCL exceeds the maximum concentration. The maximum concentration was used as the EPC.

3 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.

U.S. EPA, 1994:Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

TABLE 3.11.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Former Building 234	Benzo(a)pyrene	mg/kg	(1)	(1)	0.055 J	0.055	mg/kg	Maximum Detected Concentration	(1)
	Aluminum	mg/kg	9,990	12,600 (N)	23,300	12,600	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Arsenic	mg/kg	12.1	23.3 (G)	42	23.3	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	18.5	25.4 (G)	60.2	25.4	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01
	Cobalt	mg/kg	10.5	13.3 (N)	25	13.3	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Iron	mg/kg	26,200	31,600 (N)	50,000	31,600	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Manganese	mg/kg	450	684 (G)	2,450	684	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

TABLE 3.12.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Former Building 234	cis-1,2-Dichloroethene	ug/L	(1)	(1)	12.7	12.7	ug/L	Maximum Detected Concentration	(1)
	Trichloroethene (Mutagenic)	ug/L	(1)	(1)	3.9	3.9	ug/L	Maximum Detected Concentration	(1)
	Trichloroethene (Nonmutagenic)	ug/L	(1)	(1)	3.9	3.9	ug/L	Maximum Detected Concentration	(1)
	Vinyl Chloride	ug/L	(1)	(1)	0.263 J	0.263	ug/L	Maximum Detected Concentration	(1)
	Aluminum	ug/L	(1)	(1)	53.7	53.7	ug/L	Maximum Detected Concentration	(1)
	Arsenic	ug/L	(1)	(1)	1.32 J	1.32	ug/L	Maximum Detected Concentration	(1)
	Cobalt	ug/L	(1)	(1)	1.74 J	1.74	ug/L	Maximum Detected Concentration	(2)
	Iron	ug/L	(1)	(1)	459	459	ug/L	Maximum Detected Concentration	(1)
	Manganese	ug/L	(1)	(1)	532	532	ug/L	Maximum Detected Concentration	(1)

Notes:

1 - Only one groundwater sample was collected at Building 234 in 2011 therefore statistics could not be calculated. The maximum detected concentration is used as the exposure point concentration for groundwater.

TABLE 3.13.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DEREKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
South Waterfront	Aluminum	mg/kg	12,000	15,800 (N)	17,400	15,800	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Arsenic	mg/kg	17.1	23.7 (N)	26.3	23.7	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	14.7	19.1 (N)	21.2	19.1	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Cobalt	mg/kg	16.5	23.8 (N)	29.9	23.8	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Iron	mg/kg	31,900	41,800 (N)	45,500	41,800	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

N = Normal

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

TABLE 3.14.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Unpaved PCB Removal Area Surface Soil	Benzo(a)anthracene	mg/kg	(1)	(1)	0.13	0.13	mg/kg	Maximum Detected Concentration	(1)
	Benzo(a)pyrene	mg/kg	(1)	(1)	0.12	0.12	mg/kg	Maximum Detected Concentration	(1)
	Benzo(b)fluoranthene	mg/kg	(1)	(1)	0.18	0.18	mg/kg	Maximum Detected Concentration	(1)
	Benzo(g,h,i)perylene	mg/kg	(1)	(1)	0.072	0.072	mg/kg	Maximum Detected Concentration	(1)
	Benzo(k)fluoranthene	mg/kg	(1)	(1)	0.086	0.086	mg/kg	Maximum Detected Concentration	(1)
	Chrysene	mg/kg	(1)	(1)	0.14	0.14	mg/kg	Maximum Detected Concentration	(1)
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.0174	0.017	mg/kg	Maximum Detected Concentration	(1)
	Indeno(1,2,3-cd)pyrene	mg/kg	(1)	(1)	0.071	0.071	mg/kg	Maximum Detected Concentration	(1)
	Total Aroclors	mg/kg	(1)	(1)	0.0244	0.0244	mg/kg	Maximum Detected Concentration	(1)
	Arsenic	mg/kg	(1)	(1)	21.7	21.7	mg/kg	Maximum Detected Concentration	(1)
	Cobalt	mg/kg	(1)	(1)	22.7	22.7	mg/kg	Maximum Detected Concentration	(1)
	Iron	mg/kg	(1)	(1)	30,600	30,600	mg/kg	Maximum Detected Concentration	(1)
	Manganese	mg/kg	(1)	(1)	619	619	mg/kg	Maximum Detected Concentration	(1)

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

TABLE 3.15.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
PCB Removal Area	Benzo(a)anthracene	mg/kg	(1)	(1)	5.74	5.74	mg/kg	Maximum Detected Concentration	(1)
	Benzo(a)pyrene	mg/kg	(1)	(1)	4.92	4.92	mg/kg	Maximum Detected Concentration	(1)
	Benzo(b)fluoranthene	mg/kg	(1)	(1)	7.12	7.12	mg/kg	Maximum Detected Concentration	(1)
	Benzo(g,h,i)perylene	mg/kg	(1)	(1)	2.07	2.07	mg/kg	Maximum Detected Concentration	(1)
	Benzo(k)fluoranthene	mg/kg	(1)	(1)	2.48	2.48	mg/kg	Maximum Detected Concentration	(1)
	Chrysene	mg/kg	(1)	(1)	5.65	5.65	mg/kg	Maximum Detected Concentration	(1)
	Dibenzo(a,h)anthracene	mg/kg	(1)	(1)	0.82	0.82	mg/kg	Maximum Detected Concentration	(1)
	Indeno(1,2,3-cd)pyrene	mg/kg	(1)	(1)	2.07	2.07	mg/kg	Maximum Detected Concentration	(1)
	Total Aroclors	mg/kg	(2)	(2)	0.416	0.416	mg/kg	Maximum Detected Concentration	(2)
	Arsenic	mg/kg	(1)	(1)	21.8	21.8	mg/kg	Maximum Detected Concentration	(1)
	Cobalt	mg/kg	(1)	(1)	22.7	22.7	mg/kg	Maximum Detected Concentration	(1)
	Iron	mg/kg	(1)	(1)	32,000	32,000	mg/kg	Maximum Detected Concentration	(1)
	Manganese	mg/kg	(1)	(1)	619	619	mg/kg	Maximum Detected Concentration	(1)

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

(2) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

I assumed the units were ug/kg and converted to mg/kg.

TABLE 3.16.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
PCB Removal Area	Benzo(a)anthracene	mg/kg	0.099	0.146 (G)	0.252	0.146	mg/kg	95% KM (BCA) UCL	ProUCL 4.1.01
	Benzo(a)pyrene	mg/kg	0.079	0.167 (G)	0.172	0.167	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.1.01
	Benzo(b)fluoranthene	mg/kg	0.119	0.322 (G)	0.336	0.322	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.1.01
	Dibenzo(a,h)anthracene	mg/kg	0.041	0.044 (L)	0.0437	0.044	mg/kg	95% KM (BCA) UCL	ProUCL 4.1.01
	Aluminum	mg/kg	11,300	16,100 (N)	19,900	16,100	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Arsenic	mg/kg	16.3	35.0 (G)	47.2	35	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01
	Chromium VI	mg/kg	13.4	19.1 (N)	25.6	19.1	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Cobalt	mg/kg	12.4	18.7 (N)	24	18.7	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Iron	mg/kg	27,200	37,600 (N)	43,600	37,600	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Manganese	mg/kg	520	872 (G)	1,190	872	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

RAGS Part D Table 4
Values Used For Daily Intake Calculations

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RAGS PART D TABLE 4
VALUES USED FOR DAILY INTAKE CALCULATIONS

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TABLE 4.1.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SOILS
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adolescent	Derecktor Shipyard	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) = $\frac{CS \times IRS \times CF3 \times FI \times EF \times ED}{BW \times AT}$
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1997	
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				FI	Fraction Ingested	1	unitless	USEPA, 1997	
				EF	Exposure Frequency	48	days/year	(1)	
				ED	Exposure Duration	10	years	(2)	
				BW	Body Weight	50	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3650	days	USEPA, 1989	
Dermal	Trespassers	Adolescent	Derecktor Shipyard	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) = $\frac{CS \times CF3 \times SA \times SSAF \times DABS \times EV \times EF \times ED}{BW \times AT}$
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				SA	Skin Surface Available for Contact	5050	cm ²	(3)	
				SSAF	Soil to Skin Adherence Factor	0.4	mg/cm ² /event	USEPA, 2004	
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	48	days/year	(1)	
				ED	Exposure Duration	10	years	(2)	
				BW	Body Weight	50	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3650	days	USEPA, 1989	

Notes:

- 1 - Assumes two days a week for 24 weeks (mid-April through mid-October).
- 2 - Adolescent ages 6 to 16 years old and an adult ages 16 to 36 years old for a total exposure duration of 30 years.
- 3 - Assumes assumes that the head, forearms, hands, lower legs, and feet are exposed (USEPA, 1997).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 1997: Exposure Factors Handbook. USEPA/600/6-95/002FA.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 3.76E-08

Cancer Dermal Intake = 7.59E-07

Noncancer Ingestion Intake = 2.63E-07

Noncancer Dermal Intake = 5.31E-06

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.2.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SOILS TO AIR
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Inhalation	Trespassers	Adolescent	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	$\text{Exposure Concentration (mg/m}^3\text{)} = \frac{\text{CA} \times \text{ET} \times \text{EF} \times \text{ED}}{\text{AT} \times 24 \text{ hours/day}}$ $\text{CA} = (1/\text{PEF} + 1/\text{VF}) \times \text{Cs}$
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	4	hours/day	(1)	
				EF	Exposure Frequency	48	days/year	(1)	
				ED	Exposure Duration	10	years	(2)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.10E+10	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	73.95045	g/m2-s per kg/m3	USEPA, 2012	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2012	
				Um	Mean annual wind speed	3.84	m/sec	USEPA, 2012	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2012	
				F(x)	Function dependent of Um/Ut	0.0345	unitless	USEPA, 2012	

Notes:

1 - Assumes 4 hours a day, two days a week for 24 weeks (mid-April through mid-October).

2 - Adolescent ages 6 to 16 years old and an adult ages 16 to 36 years old for a total exposure duration of 30 years.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.lsd.ornl.gov/calc_start.htm. Site-specific values for Hartford, Connecticut.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 3.13E-03

Noncancer Inhalation Intake = 2.19E-02

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.3 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT RECREATIONAL USERS - SOILS
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Ingestion	Trespassers	Adult	Derecktor Shipyard	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) = $\frac{CS \times IRS \times CF3 \times FI \times EF \times ED}{BW \times AT}$
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1991	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				FI	Fraction Ingested	1	unitless	USEPA, 1997	
				EF	Exposure Frequency	48	days/year	(1)	
				ED2	Exposure Duration (Age 16 - 30)	20	years	(2)	
				BW	Body Weight	70	kg	USEPA, 1989	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 1989	
Dermal	Trespassers	Adult	Derecktor Shipyard	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) = $\frac{CS \times CF3 \times SA \times SSAF \times DABS \times EV \times EF \times ED}{BW \times AT}$
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	5,700	cm ²	USEPA, 2004	
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm ² /event	USEPA, 2004	
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	48	days/year	(1)	
				ED2	Exposure Duration (Age 16 - 30)	20	years	(2)	
				BW	Body Weight	70	kg	USEPA, 1989	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 1989	

Notes:

1 - Assumes two days a week for 24 weeks (mid-April through mid-October).

2 - Adolescent ages 6 to 16 years old and an adult ages 16 to 36 years old for a total exposure duration of 30 years.

Sources:

USEPA, 1999: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1991: Risk Assessment Guidance for Superfund - Supplemental Guidance- Standard Default Exposure Factors Interim Final.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 30) = 5.37E-08 Cancer Dermal Intake (Age 6 - 30) = 2.14E-07

Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 16) = 0.00E+00 Cancer Dermal Intake (Age 6 - 16) = 0.00E+00

Cancer Ingestion Intake Age 16 - 30) = 5.37E-08 Cancer Dermal Intake (Age 16 - 30) = 2.14E-07

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 1.88E-07 Noncancer Dermal Intake = 7.50E-07

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.4.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT RECREATIONAL USERS - SOILS TO AIR
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Inhalation	Trespassers	Adult	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	$\text{Exposure Concentration (mg/m}^3\text{)} = \frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$ $CA = (1/PEF + 1/VF) \times Cs$
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	4	hours/day	(1)	
				EF	Exposure Frequency	48	days/year	(1)	
				ED2	Exposure Duration (Age 16 - 30)	20	years	(2)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.10E+10	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	73.95045	g/m2-s per kg/m3	USEPA, 2012	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2012	
				Um	Mean annual wind speed	3.84	m/sec	USEPA, 2012	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2012	
				F(x)	Function dependent of Um/Ut	0.0345	unitless	USEPA, 2012	

Notes:

1 - Assumes 4 hours a day, two days a week for 24 weeks (mid-April through mid-October).

2 - Adolescent ages 6 to 16 years old and an adult ages 16 to 36 years old for a total exposure duration of 30 years.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.lsd.ornl.gov/calc_start.htm. Site-specific values for Hartford, Connecticut.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Non-Mutagenic Chemicals

Cancer Inhalation Intake (Age 6 - 30) = 6.26E-03

Mutagenic Chemicals

Cancer Inhalation Intake (Age 6 - 16) = 0.00E+00

Cancer Inhalation Intake (Age 16 - 30) = 6.26E-03

Noncarcinogenic Chemicals

Noncancer Inhalation Intake = 2.19E-02

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.5.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS- SOILS
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Workers	Adult	Derecktor Shipyard	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) = $\frac{CS \times IRS \times CF3 \times FI \times EF \times ED}{BW \times AT}$
				IR-S	Ingestion Rate	330	mg/day	USEPA, 2002b	
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				FI	Fraction Ingested	1	unitless	USEPA, 2002b	
				EF	Exposure Frequency	130	days/year	(1)	
				ED	Exposure Duration	1	years	USEPA, 2002b	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
Dermal	Construction Workers	Adult	Derecktor Shipyard	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Dermally Absorbed Dose (mg/kg/day) = $\frac{CS \times CF3 \times SA \times SSAF \times DABS \times EV \times EF \times ED}{BW \times AT}$
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	
				SSAF	Soil to Skin Adherence Factor	0.3	mg/cm2/event	USEPA, 2004	
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	130	days/year	(1)	
				ED	Exposure Duration	1	years	USEPA, 2002b	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

Notes:

1 - Professional judgment. Assumes 5 days a week over six months.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

$$\text{Incidental Ingestion Intake} = (IR-S \times CF3 \times FI \times EF \times ED) / (BW \times AT)$$

$$\text{Dermal Intake} = (CF3 \times SA \times SSAF \times EF \times ED) / (BW \times AT)$$

$$\text{Cancer Ingestion Intake} = 2.40E-08$$

$$\text{Cancer Dermal Intake} = 7.20E-08$$

$$\text{Noncancer Ingestion Intake} = 1.68E-06$$

$$\text{Noncancer Dermal Intake} = 5.04E-06$$

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.6.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS - SOILS TO AIR
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Inhalation	Construction Workers	Adult	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	$\text{Exposure Concentration (mg/m}^3\text{)} = \frac{\text{CA} \times \text{ET} \times \text{EF} \times \text{ED}}{\text{AT} \times 24 \text{ hours/day}}$ $\text{CA} = (1/\text{PEF} + 1/\text{VF}) \times \text{Cs}$
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	8	hours/day	(1)	
				EF	Exposure Frequency	130	days/year	(1)	
				ED	Exposure Duration	1	years	USEPA, 2002b	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.40E+06	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	

Notes:

1 - Professional judgment. Assumes 5 days a week over six months.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

Unit Intake Calculations

Unit Exposure Concentration = $(\text{ET} \times \text{EF} \times \text{ED}) / (\text{AT} \times 24 \text{ hours/day})$

Cancer Inhalation Intake = 1.70E-03

Noncancer Inhalation Intake = 1.19E-01

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.7.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS - GROUNDWATER
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Workers	Adult	Derecktor Shipyards	CGW	Chemical Concentration in Groundwater	Maximum	ug/L	USEPA Region I, 1999	Chronic Daily Intake (CDI) (mg/kg/day) = $\frac{CGW \times CF \times IR-GW \times EF \times ED}{BW \times AT}$
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.05	L/day	(1)	
				EF	Exposure Frequency	130	days/year	(1)	
				ED	Exposure Duration	1	years	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
Dermal	Construction Workers	Adult	Derecktor Shipyards	AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	Dermally Absorbed Dose (mg/kg/day) = $\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$ For inorganics DAevent = Kp x CW x CF x tevent For organics if tevent <= t* DAevent = 2 x FA x Kp x CW x CF x sqrt[(6 x t x tevent)/pi] For organics if tevent > t* DAevent = FA x Kp x CW x CF x [tevent/(1+B) + 2 x t + (1 + 3B + 3B²)/(1+B²)]
				DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm²-event	USEPA, 2004	
				CW	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2002	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	
				CF	Conversion factor	0.001	L/cm³	--	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	
				tevent	Duration of event	8	hr/event	(1)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	
				SA	Skin Surface Available for Contact	3300	cm²	USEPA, 2004	
				EV	Event Frequency	1	events/day	(1)	
				EF	Exposure Frequency	130	days/year	(1)	
				ED	Exposure Duration	1	years	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

Notes:

1 - Professional judgment. Assumes 5 days a week over six months.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA Region I, 1999. Risk Updates, Number 5.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

$$\text{Dermal Intake} = (SA \times EV \times EF \times ED) / (BW \times AT)$$

$$\text{Cancer Dermal Intake} = 2.40E-01$$

$$\text{Noncancer Dermal Intake} = 1.68E+01$$

Cancer risk from dermal contact = Groundwater concentration x Cancer Dermal Intake x DAevent x Dermal Cancer Slope Factor

Hazard Index from dermal contact = Groundwater concentration x Noncancer Dermal Intake x DAevent / Dermal Reference Dose

TABLE 4.8.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS - GROUNDWATER TO AIR
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Inhalation	Construction Workers	Adult	Derecktor Shipyards	CA	Chemical concentration in air	Calculated	mg/m3	VDEQ, 2004	$\text{Exposure Concentration (mg/m}^3\text{)} = \frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$ $CA = CW \times CF \times VF$
				CW	Chemical concentration in water.	Average	ug/L	--	
				CF	Conversion Factor	0.001	mg/ug	--	
				ET	Exposure Time	8	hours/day	(1)	
				EF	Exposure Frequency	130	days/year	(1)	
				ED	Exposure Duration	1	years	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
				VF	Volatilization Factor	Calculated	(mg/m3)/(mg/L)	VDEQ, 2012	

Notes:

1 - Professional judgment. Assumes 5 days a week over six months.

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

VDEQ, 2012: Virginia Department of Environmental Quality (VDEQ, online- <http://www.deq.state.va.us/vrprisk/homepage.html>).

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 1.70E-06

Noncancer Inhalation Intake = 1.19E-04

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.9.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - INDUSTRIAL WORKERS - SOIL
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Industrial Workers	Adult	Derecktor Shipyards	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) = $CS \times IRS \times CF3 \times FI \times EF \times ED$ BW x AT
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1997	
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				FI	Fraction Ingested	1	unitless	USEPA, 2004	
				EF	Exposure Frequency	250	days/year	USEPA, 2004; RIDEM, 2011	
				ED	Exposure Duration	25	years	USEPA, 1997; RIDEM, 2011	
				BW	Body Weight	70	kg	USEPA, 1997; RIDEM, 2011	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989; RIDEM, 2011	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989; RIDEM, 2011	
Dermal	Industrial Workers	Adult	Derecktor Shipyards	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) = $CS \times CF3 \times SA \times SSAF \times DABS \times EV \times EF \times ED$ BW x AT
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	250	days/year	USEPA, 2004	
				ED	Exposure Duration	25	years	USEPA, 1997	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

RIDEM, 2011: Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

Unit Intake Calculations

$$\text{Incidental Ingestion Intake} = (IR-S \times CF3 \times FI \times EF \times ED) / (BW \times AT)$$

$$\text{Dermal Intake} = (CF3 \times SA \times SSAF \times EF \times ED) / (BW \times AT)$$

$$\text{Cancer Ingestion Intake} = 3.49E-07$$

$$\text{Cancer Dermal Intake} = 2.31E-06$$

$$\text{Noncancer Ingestion Intake} = 9.78E-07$$

$$\text{Noncancer Dermal Intake} = 6.46E-06$$

$$\text{Cancer risk from ingestion} = \text{Soil concentration} \times \text{Cancer Ingestion Intake} \times \text{Oral Cancer Slope Factor}$$

$$\text{Cancer risk from dermal contact} = \text{Soil concentration} \times \text{Cancer Dermal Intake} \times \text{Absorption Factor} \times \text{Dermal Cancer Slope Factor}$$

$$\text{Hazard Index from ingestion} = \text{Soil concentration} \times \text{Noncancer Ingestion Intake} / \text{Oral Reference Dose}$$

$$\text{Hazard Index from dermal contact} = \text{Soil concentration} \times \text{Noncancer Dermal Intake} \times \text{Absorption Factor} / \text{Dermal Reference Dose}$$

TABLE 4.10.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - INDUSTRIAL WORKERS - SOIL TO AIR
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Workers	Adult	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	$\text{Exposure Concentration (mg/m}^3\text{)} =$ $\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$ $CA = (1/PEF + 1/VF) \times Cs$
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	8	hours/day	(1)	
				EF	Exposure Frequency	250	days/year	USEPA, 1997	
				ED	Exposure Duration	25	years		
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.10E+10	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	73.95045	g/m2 · s per kg/m3	USEPA, 2012	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2012	
				Um	Mean annual wind speed	3.84	m/sec	USEPA, 2012	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2012	
				F(x)	Function dependent of Um/Ut	0.0345	unitless	USEPA, 2012	

Notes:

1 - Length of typical work day.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.lsd.oel.gov/calc_start.htm. Site-specific values for Hartford, Connecticut.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 8.15E-02

Noncancer Inhalation Intake = 2.28E-01

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.11.1.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - INDUSTRIAL WORKERS - GROUNDWATER
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Industrial Workers	Adult	Derecktor Shipyard	CGW	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) = $\frac{CGW \times CF \times IR-GW \times EF \times ED}{BW \times AT}$
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	1	L/day	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 2004	
				ED	Exposure Duration	25	years	USEPA, 1997; RIDEM, 2011	
				BW	Body Weight	70	kg	USEPA, 1997; RIDEM, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989; RIDEM, 2011	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1989; RIDEM, 2011	
Dermal	Industrial Workers	Adult	Derecktor Shipyard	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) = $\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$ For inorganics DAevent = Kp x CW x CF x tevent For organics if tevent <= t* DAevent = 2 x FA x Kp x CW x CF x sqrt[(6 x t x tevent)/pi] For organics if tevent > t* DAevent = FA x Kp x CW x CF x [tevent/(1+B) + 2 x t + (1 + 3B + 3B^2)/(1+B^2)]
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2002	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	
				CF	Conversion factor	0.001	L/cm3	--	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				t	Lag time	Chemical Specific	hr/event	USEPA, 2004	
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	
				tevent	Duration of event	0.5	hr/event	(1)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	
				SA	Skin Surface Available for Contact	904	cm2	(2)	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	250	days/year	USEPA, 2004	
				ED	Exposure Duration	25	years	USEPA, 1997; RIDEM, 2011	
				BW	Body Weight	70	kg	USEPA, 1997; RIDEM, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989; RIDEM, 2011	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1989; RIDEM, 2011	

Notes:

1 - Professional judgment.

2 - Represents hands of the industrial worker, USEPA, 2004.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1991: Human Health Evaluation Manual. Supplemental Guidance: Standard Default Exposure Factors. OSWER Directive 9285.6-03.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

RIDEM, 2011: Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

Unit Intake Calculations

Ingestion Intake = (IR-GW x EF x ED)/(BW x AT)

Dermal Intake = (SA x EV x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 30) = 3.49E-06 Cancer Dermal Intake (Age 6 - 30) = 3.16E+00

Mutagenic Chemicals

Cancer Ingestion Intake ure Duration = 3.49E-06 Cancer Dermal Intake ure Duration = 3.16E+00

Cancer Ingestion Intake = 0.00E+00 Cancer Dermal Intake = 0.00E+00

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 9.78E-06 Noncancer Dermal Intake = 8.85E+00

Cancer risk from ingestion = Groundwater concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Groundwater concentration x Cancer Dermal Intake x DAevent x Dermal Cancer Slope Factor

Hazard Index from ingestion = Groundwater concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Groundwater concentration x Noncancer Dermal Intake x DAevent / Dermal Reference Dose

TABLE 4.12.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS - SOILS
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Child	Derecktor Shipyard	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) = $\frac{CS \times IRS \times CF3 \times FI \times EF \times ED}{BW \times AT}$
				IR-S	Ingestion Rate	200	mg/day	USEPA, 1997;RIDEM, 2011	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				FI	Fraction Ingested	1	unitless	--	
				EF	Exposure Frequency	350	days/year	USEPA, 2004;RIDEM, 2011	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	15	kg	USEPA, 1997;RIDEM, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989;RIDEM, 2011	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	
Dermal	Resident	Child	Derecktor Shipyard	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) = $\frac{CS \times CF3 \times SA \times SSAF \times DABS \times EV \times EF \times ED}{BW \times AT}$
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,800	cm ²	USEPA, 2004	
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm ² /event	USEPA, 2004	
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	15	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	

Notes:

1 - Children were evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children were evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
RIDEM, 2011: Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 0 - 6) = 1.10E-06 Cancer Dermal Intake (Age 0 - 6) = 3.07E-06

Mutagenic Chemicals

Cancer Ingestion Intake (Age 0 - 2) = 3.65E-07 Cancer Dermal Intake (Age 0 - 2) = 1.02E-06

Cancer Ingestion Intake (Age 2 - 6) = 7.31E-07 Cancer Dermal Intake (Age 2 - 6) = 2.05E-06

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 1.28E-05 Noncancer Dermal Intake = 3.58E-05

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.13.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS SOILS TO AIR
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Child	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m ³) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2002a	$\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$
				EF	Exposure Frequency	350	days/year	USEPA, 2002a;RIDEM, 2011	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	$CA = (1/PEF + 1/VF) \times Cs$
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1989, 2005	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2190	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.10E+10	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	73.95045	g/m2-s per kg/m3	USEPA, 2012	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2012	
				Um	Mean annual wind speed	3.84	m/sec	USEPA, 2012	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2012	
				F(x)	Function dependent of Um/Ut	0.0345	unitless	USEPA, 2012	

Notes:

1 - Children were evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children were evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.isd.ornl.gov/calc_start.htm. Site-specific values for Philadelphia, Pennsylvania.

RIDEM, 2011: Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Non-Mutagenic Chemicals

Cancer Inhalation Intake (Age 0 - 6) = 8.22E-02

Mutagenic Chemicals

Cancer Inhalation Intake (Age 0 - 2) = 2.74E-02

Cancer Inhalation Intake (Age 2 - 6) = 5.48E-02

Noncarcinogenic Chemicals

Noncancer Inhalation Intake = 1.92E+00

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.14.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS - GROUNDWATER
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Child	Derecktor Shipyard	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) = $\frac{CGW \times CF \times IR-GW \times EF \times ED}{BW \times AT}$
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	1	L/day	USEPA, 1997	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	15	kg	USEPA, 1987	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
Dermal	Residents	Child	Derecktor Shipyard	AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	Dermally Absorbed Dose (mg/kg/day) = $\frac{DA_{event} \times EV \times EF \times ED \times SA}{BW \times AT}$ For inorganics $DA_{event} = Kp \times CW \times CF \times t_{event}$ For organics if $t_{event} < t^*$ $DA_{event} = 2 \times FA \times Kp \times Cw \times CF \times \sqrt{[6 \times t \times t_{event}]/\pi]}$ $DA_{event} = FA \times Kp \times Cw \times CF \times [t_{event}/(1+B) + 2 \times t + (1 + 3B + 3B^2)/(1+B^2)]$
				DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2002	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	
				CF	Conversion factor	0.001	L/cm3	--	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	
				t^*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	
				tevent	Duration of event	1	hr/event	USEPA, 2004	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	
				SA	Skin Surface Available for Contact	6,600	cm2	USEPA, 2004	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	15	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	

Notes:

1 - Children were evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children were evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Ingestion Intake = $(IR-GW \times EF \times ED)/(BW \times AT)$

Dermal Intake = $(SA \times EV \times EF \times ED)/(BW \times AT)$

Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 0 - 6) = 5.48E-06 Cancer Dermal Intake Time (Age 0 - 6) = 3.62E+01

Mutagenic Chemicals

Cancer Ingestion Intake (Age 0 - 2) = 1.83E-06 Cancer Dermal Intake (Age 0 - 2) = 1.21E+01

Cancer Ingestion Intake (Age 2 - 6) = 3.65E-06 Cancer Dermal Intake (Age 2 - 6) = 2.41E+01

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 6.39E-05 Noncancer Dermal Intake = 4.22E+02

Cancer risk from ingestion = Groundwater concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Groundwater concentration x Cancer Dermal Intake x DAevent x Dermal Cancer Slope Factor

Hazard Index from ingestion = Groundwater concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Groundwater concentration x Noncancer Dermal Intake x DAevent / Dermal Reference Dose

TABLE 4.15.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS - INHALATION OF VOLATILES FROM GROUNDWATER
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Inhalation	Residents	Child	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 1991	$\text{Exposure Concentration (mg/m}^3\text{)} = \frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$ $CA = CW \times CF \times VF$
				GW	Chemical concentration in water.	95% UCL or Max	ug/L	USEPA, 2002	
				CF	Conversion Factor	0.001	mg/ug	--	
				ET	Exposure Time	24	hours/day	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1989, 2005	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1997	
				AT-N	Averaging Time (Non-Cancer)	2190	days	USEPA, 1989	
				VF	Volatilization Factor	0.5	L/m3	USEPA, 1989	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1991: Human Health Evaluation Manual, Part B: Development of Risk-based Preliminary Remediation Goals. OSWER Directive 9285.7-01B.

USEPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

Unit Intake Calculations

$$\text{Unit Exposure Concentration} = (ET \times EF \times ED) / (AT \times 24 \text{ hours/day})$$

$$\text{Cancer Inhalation Intake} = 2.74\text{E-}05$$

$$\text{Noncancer Inhalation Intake} = 3.20\text{E-}04$$

$$\text{Cancer risk from ingestion} = \text{Air concentration} \times \text{Cancer Inhalation Intake} \times \text{Inhalation Cancer Slope Factor}$$

$$\text{Hazard Index from ingestion} = \text{Air concentration} \times \text{Noncancer Inhalation Intake} / \text{Inhalation Reference Dose}$$

TABLE 4.16.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - SOILS
FORMER DEREKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Adult	Derektor Shipyard	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) = $\frac{CS \times IRS \times CF3 \times FI \times EF \times ED}{BW \times AT}$
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1997; RIDEM, 2011	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				FI	Fraction Ingested	1	unitless	--	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	70	kg	USEPA, 1997; RIDEM, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989; RIDEM, 2011	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	
Dermal	Resident	Adult	Derektor Shipyard	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) = $\frac{CS \times CF3 \times SA \times SSAF \times DABS \times EV \times EF \times ED}{BW \times AT}$
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	5,700	cm ²	USEPA, 2004	
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm ² /event	USEPA, 2004	
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	

Notes:

1 - Adults were evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults were evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.
USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.
USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E; Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
RIDEM, 2011: Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

Unit Intake Calculations

Incidental Ingestion Intake = $(IR-S \times CF3 \times FI \times EF \times ED) / (BW \times AT)$

Dermal Intake = $(CF3 \times SA \times SSAF \times EF \times ED) / (BW \times AT)$

Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 30) = 4.70E-07 Cancer Dermal Intake (Age 6 - 30) = 1.87E-06

Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 16) = 1.96E-07 Cancer Dermal Intake (Age 6 - 16) = 7.81E-07

Cancer Ingestion Intake (Age 16 - 30) = 2.74E-07 Cancer Dermal Intake (Age 16 - 30) = 1.09E-06

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 1.37E-06 Noncancer Dermal Intake = 5.47E-06

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.17.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - SOILS TO AIR
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m ³) = $\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$ $CA = (1/PEF + 1/VF) \times Cs$ $PEF = \frac{Q}{C \times 3600}$ $0.036 \times (1 - V) \times (U_m / U_1)^2 \times F(x)$ $F(x) = 0.18 \times (8x^3 + 12x) \times \exp(-x^2)$ $x = 0.886 \times U_1 / U_m$
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2002a	
				EF	Exposure Frequency	350	days/year	USEPA, 2002a; RIDEM, 2011	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8760	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.10E+10	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	73.95045	g/m2-s per kg/m3	USEPA, 2012	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2012	
				Um	Mean annual wind speed	3.84	m/sec	USEPA, 2012	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2012	
				F(x)	Function dependent of Um/Ut	0.0345	unitless	USEPA, 2012	

Notes:

1 - Adults were evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults were evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.
USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.
USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.
USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.
USEPA, 2012: Soil Screening Guidance calculation Internet site at http://risk.lsd.ornl.gov/calc_start.htm. Site-specific values for Hartford, Connecticut.
RIDEM, 2011: Rhode Island Department of Environmental Management, DEM-DSR-01-93, November 2011.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Non-Mutagenic Chemicals

Cancer Inhalation Intake (Age 6 - 30) = 3.29E-01

Mutagenic Chemicals

Cancer Inhalation Intake (Age 6 - 16) = 1.37E-01

Cancer Inhalation Intake (Age 16 - 30) = 1.92E-01

Noncarcinogenic Chemicals

Noncancer Inhalation Intake = 9.59E-01

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.18.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - GROUNDWATER
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Adult	Derecktor Shipyard	CGW	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) = $\frac{CGW \times CF \times IR-GW \times EF \times ED}{BW \times AT}$
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	2	L/day	USEPA, 1997	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
Dermal	Residents	Adult	Derecktor Shipyard	AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	Dermally Absorbed Dose (mg/kg/day) = $\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$ For inorganics $DAevent = Kp \times CW \times CF \times t_{event}$ For organics if $t_{event} \leq 1^*$ $DAevent = 2 \times FA \times Kp \times Cw \times CF \times \sqrt{[(6 \times t \times t_{event})/p]}$ For organics if $t_{event} > 1^*$ $DAevent = FA \times Kp \times Cw \times CF \times [t_{event}/(1+B) + 2 \times t + (1 + 3B + 3B^2)/(1+B^2)]$
				DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2002	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	
				CF	Conversion factor	0.001	L/cm3	--	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	
				t^*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	
				t_{event}	Duration of event	0.58	hr/event	(1)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	
				SA	Skin Surface Available for Contact	18,000	cm2	USEPA, 2004	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	
				BW	Body Weight	70	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	

Notes:

1 - Adults were evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults were evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Ingestion Intake = (IR-GW x EF x ED)/(BW x AT)

Dermal Intake = (SA x EV x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 30) = 9.39E-06 Cancer Dermal Intake (Age 6 - 30) = 8.45E+01

Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 16) = 3.91E-06 Cancer Dermal Intake (Age 6 - 16) = 3.52E+01

Cancer Ingestion Intake (Age 16 - 30) = 5.48E-06 Cancer Dermal Intake (Age 16 - 30) = 4.93E+01

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 2.74E-05 Noncancer Dermal Intake = 2.47E+02

Cancer risk from ingestion = Groundwater concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Groundwater concentration x Cancer Dermal Intake x DAevent x Dermal Cancer Slope Factor

Hazard Index from ingestion = Groundwater concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Groundwater concentration x Noncancer Dermal Intake x DAevent / Dermal Reference Dose

TABLE 4.19.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - INHALATION OF VOLATILES FROM GROUNDWATER
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Residents	Adult	Derecktor Shipyard	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 1991	$\text{Exposure Concentration (mg/m}^3\text{)} = \frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$ $CA = CW \times CF \times VF$
				GW	Chemical concentration in water.	95% UCL or Max	ug/L	USEPA, 2002	
				CF	Conversion Factor	0.001	mg/ug	--	
				ET	Exposure Time	24	hours/day	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1989, 2005	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1989, 2005	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1997	
				AT-N	Averaging Time (Non-Cancer)	8496	days	USEPA, 1989	
				VF	Volatilization Factor	0.5	L/m3	USEPA, 1989	

Notes:

1 - Adults will be evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults will be evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1991: Human Health Evaluation Manual, Part B: Development of Risk-based Preliminary Remediation Goals. OSWER Directive 9285.7-01B.

USEPA, 1997: Exposure Factors Handbook. USEPA/600/8-95/002FA.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

Unit Intake Calculations

$$\text{Unit Exposure Concentration} = (ET \times EF \times ED) / (AT \times 24 \text{ hours/day})$$

$$\text{Cancer Inhalation Intake} = 1.37\text{E-}04$$

$$\text{Noncancer Inhalation Intake} = 4.12\text{E-}04$$

$$\text{Cancer risk from ingestion} = \text{Air concentration} \times \text{Cancer Inhalation Intake} \times \text{Inhalation Cancer Slope Factor}$$

$$\text{Hazard Index from ingestion} = \text{Air concentration} \times \text{Noncancer Inhalation Intake} / \text{Inhalation Reference Dose}$$

RAGS Part D Table 5
Non-Cancer Toxicity Data

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NON-CANCER TOXICITY DATA

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| 5-1 | Non-Cancer Toxicity Data - Oral/Dermal |
| 5-2 | Non-Cancer Toxicity Data - Inhalation |

**TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND**

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Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal ⁽¹⁾	Absorbed RfD for Dermal ⁽²⁾		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds										
cis-1,2-Dichloroethene	Subchronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Kidney	300/1	PPRTV	2/3/2011
	Chronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	Kidney	3000/1	IRIS	9/21/2012
	Subchronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Liver	100/1	HEAST	9/97
Tetrachloroethene	Chronic	6.0E-03	mg/kg/day	1	6.0E-03	mg/kg/day	Neurotoxicity	1000/1	IRIS	9/21/2012
Trichloroethene	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Immune System, Developmental	10 - 1000	IRIS	9/21/2012
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Liver	30/1	IRIS	9/21/2012
Semivolatile Organic Compounds										
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene ⁽³⁾	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Kidney	3000/1	IRIS	9/21/2012
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs										
Total Aroclors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics										
Aluminum	Subchronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Central Nervous System	30/1	ATSDR	9/2008
	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Central Nervous System	100	PPRTV	10/23/2006
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, Cardiovascular System	3/1	IRIS	9/21/2012
Beryllium	Subchronic	5.0E-03	mg/kg/day	0.007	3.5E-05	mg/kg/day	Gastrointestinal System	100/1	HEAST	9/97
	Chronic	2.0E-03	mg/kg/day	0.007	1.4E-05	mg/kg/day	Gastrointestinal System	300/1	IRIS	9/21/2012
Cadmium	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Kidney	10/1	IRIS	9/21/2012
Chromium ⁽⁴⁾	Subchronic	2.0E-02	mg/kg/day	0.025	5.0E-04	mg/kg/day	None Reported	100/3	HEAST	9/97
	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	None Reported	300/3	IRIS	6/3/2011
Cobalt	Subchronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Thyroid	300/1	PPRTV	8/25/2008
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Thyroid	3000/1	PPRTV	8/25/2008
Iron	Subchronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese ⁽⁵⁾	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	Central Nervous System	1	IRIS	6/3/2011

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Notes:

- 1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
- 2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
- 3 - Pyrene is used as a surrogate for benzo(g,h,i)perylene.
- 4 - Values are for hexavalent chromium.
- 5 - Adjusted IRIS value in accordance with IRIS.

Definitions:

- HEAST = Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Available.
ATSDR = Agency for Toxic Substances and Disease Registry.
PPRTV = Provisional Peer Reviewed Toxicity Value.

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
FORMER ROBERT E. DEREKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD ⁽¹⁾		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds									
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	Chronic	4.0E-02	mg/m ³	1.1E-02	(mg/kg/day)	Neurotoxicity	1000/1	IRIS	9/21/2012
Trichloroethene	Subchronic	5.4E-01	mg/m ³	1.5E-01	(mg/kg/day)	Central Nervous System	300/1	ATSDR	9/1997
	Chronic	2.0E-03	mg/m ³	5.7E-04	(mg/kg/day)	Immune System, Developmental	10 - 100	IRIS	9/21/2012
Vinyl Chloride	Chronic	1.0E-01	mg/m ³	2.9E-02	(mg/kg/day)	Liver	30/1	IRIS	9/21/2012
Semivolatile Organic Compounds									
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs									
Total Aroclors	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics									
Aluminum	Chronic	5.0E-03	mg/m3	1.4E-03	(mg/kg/day)	Central Nervous System	300/1	PPRTV	10/23/2006
Arsenic	Chronic	1.5E-05	mg/m3	4.3E-06	(mg/kg/day)	Skin, Cardiovascular System	NA	Cal EPA(1)	9/2009
Beryllium	Chronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Respiratory	10/1	IRIS	9/21/2012
Cadmium	Chronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Kidney, Respiratory	NA	Cal EPA(2)	12/2008
Chromium ⁽²⁾	Chronic	1.0E-04	mg/m3	2.9E-05	(mg/kg/day)	Respiratory	300/1	IRIS	9/21/2012
Cobalt	Subchronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Respiratory	100/1	PPRTV	8/25/2008
	Chronic	6.0E-06	mg/m3	1.7E-06	(mg/kg/day)	Respiratory	300/1	PPRTV	8/25/2008
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	Chronic	5.0E-05	mg/m ³	1.4E-05	(mg/kg/day)	Central Nervous System	1000/1	IRIS	9/21/2012

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Notes:

1 - Extrapolated RfD = RfC * 20m³/day / 70 kg

2 - Values are for hexavalent chromium.

Definitions:

IRIS = Integrated Risk Information System

NA = Not Applicable

ATSDR = Agency for Toxic Substances and Disease Registry.

Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

Cal EPA(2) = Technical Support Document For the Derivation of Noncancer Reference Exposure Levels, December 2008.

HEAST = Health Effects Assessment Summary Tables

NYSDOH = Final Report, Trichloroethene Air Criteria Document, New York State Department of Health, October, 2006

PPRTV = Provisional Peer Reviewed Toxicity Value.

RAGS Part D Table 6
Cancer Toxicity Data

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CANCER TOXICITY DATA

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| 6-1 | Cancer Toxicity Data - Oral/Dermal |
| 6-2 | Cancer Toxicity Data - Inhalation |

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal ⁽¹⁾	Absorbed Cancer Slope Factor for Dermal ⁽²⁾		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds								
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	9/21/2012
Tetrachloroethene	2.1E-03	(mg/kg/day) ⁻¹	1	2.1E-03	(mg/kg/day) ⁻¹	Likely to be carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - non-mutagen ^(3,4)	3.7E-02	(mg/kg/day) ⁻¹	1	3.7E-02	(mg/kg/day) ⁻¹	Carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - mutagen ^(3,4)	9.3E-03	(mg/kg/day) ⁻¹	1	9.3E-03	(mg/kg/day) ⁻¹	Carcinogenic to humans	IRIS	9/21/2012
Vinyl Chloride ⁽³⁾	7.2E-01	(mg/kg/day) ⁻¹	1	7.2E-01	(mg/kg/day) ⁻¹	A / Known human carcinogen	IRIS	9/21/2012
Semivolatile Organic Compounds								
Benzo(a)anthracene ⁽³⁾	7.3E-01	(mg/kg/day) ⁻¹	1	7.3E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Benzo(a)pyrene ⁽³⁾	7.3E+00	(mg/kg/day) ⁻¹	1	7.3E+00	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	9/21/2012
Benzo(b)fluoranthene ⁽³⁾	7.3E-01	(mg/kg/day) ⁻¹	1	7.3E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	9/21/2012
Benzo(k)fluoranthene ⁽³⁾	7.3E-02	(mg/kg/day) ⁻¹	1	7.3E-02	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Chrysene ⁽³⁾	7.3E-03	(mg/kg/day) ⁻¹	1	7.3E-03	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Dibenzo(a,h)anthracene ⁽³⁾	7.3E+00	(mg/kg/day) ⁻¹	1	7.3E+00	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Indeno(1,2,3-cd)pyrene ⁽³⁾	7.3E-01	(mg/kg/day) ⁻¹	1	7.3E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	USEPA(1)	7/1993
Pesticides/PCBs								
Total Aroclors	2.0E+00	(mg/kg/day) ⁻¹	1	2.0E+00	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	9/21/2012
Inorganics								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	(mg/kg/day) ⁻¹	1	1.5E+00	(mg/kg/day) ⁻¹	A / Known human carcinogen	IRIS	9/21/2012
Beryllium	NA	NA	NA	NA	NA	Carcinogenic potential cannot be determined	IRIS	9/21/2012
Cadmium	NA	NA	NA	NA	NA	B1 / Probable human carcinogen	IRIS	9/21/2012
Chromium ^(3,5)	5.0E-01	(mg/kg/day) ⁻¹	0.025	2.0E+01	(mg/kg/day) ⁻¹	D (Not classifiable as to human carcinogenicity)	NJDEP	4/8/2009
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	9/21/2012
Manganese	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	9/21/2012

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Notes:

1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.

2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral absorption efficiency for dermal.

3 - Trichloroethene, vinyl chloride, carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

4 - See text for a discussion of trichloroethene toxicity.

5 - Values are for hexavalent chromium.

IRIS = Integrated Risk Information System.

NA = Not Available.

Cal EPA = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

NJDEP = New Jersey Department of Environmental Protection.

USEPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor ⁽¹⁾		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds							
cis-1,2-Dichloroethene	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	9/21/2012
Tetrachloroethene	2.6E-07	(ug/m ³) ⁻¹	9.1E-04	(mg/kg/day) ⁻¹	Likely to be carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - non-mutagen ^(2,3)	3.1E-06	(ug/m ³) ⁻¹	1.1E-02	(mg/kg/day) ⁻¹	Carcinogenic to humans	IRIS	9/21/2012
Trichloroethene - mutagen ^(2,3)	1.0E-06	(ug/m ³) ⁻¹	3.5E-03	(mg/kg/day) ⁻¹	Carcinogenic to humans	IRIS	9/21/2012
Vinyl Chloride	4.4E-06	(ug/m ³) ⁻¹	1.5E-02	(mg/kg/day) ⁻¹	A / Known human carcinogen	IRIS	9/21/2012
Semivolatile Organic Compounds							
Benzo(a)anthracene ⁽²⁾	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Benzo(a)pyrene ⁽²⁾	1.1E-03	(ug/m ³) ⁻¹	3.9E+00	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Benzo(b)fluoranthene ⁽²⁾	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Benzo(g,h,i)perylene	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	9/21/2012
Benzo(k)fluoranthene ⁽²⁾	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Chrysene ⁽²⁾	1.1E-05	(ug/m ³) ⁻¹	3.9E-02	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Dibenzo(a,h)anthracene ⁽²⁾	1.2E-03	(ug/m ³) ⁻¹	4.2E+00	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Indeno(1,2,3-cd)pyrene ⁽²⁾	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg/day) ⁻¹	NA	Cal EPA	9/2009
Pesticides/PCBs							
Total Aroclors	1.0E-04	(ug/m3) ⁻¹	3.5E-01	(mg/kg/day) ⁻¹	B2 / Probable human carcinogen	IRIS	9/21/2012
Inorganics							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	(ug/m ³) ⁻¹	1.5E+01	(mg/kg/day) ⁻¹	A / Known human carcinogen	IRIS	9/21/2012
Beryllium	2.4E-03	(ug/m ³) ⁻¹	8.4E+00	(mg/kg/day) ⁻¹	B1 /Known/likely human carcinogen	IRIS	9/21/2012
Cadmium	1.8E-03	(ug/m ³) ⁻¹	6.3E+00	(mg/kg/day) ⁻¹	B1 /Known/likely human carcinogen	IRIS	9/21/2012
Chromium ^(2,4)	8.4E-02	(ug/m ³) ⁻¹	2.9E+02	(mg/kg/day) ⁻¹	A / Known human carcinogen	IRIS	9/21/2012
Cobalt	9.0E-03	(ug/m ³) ⁻¹	3.2E+01	(mg/kg/day) ⁻¹	NA	PPRTV	8/25/2008
Iron	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	9/21/2012
Manganese	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	9/21/2012

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
FORMER ROBERT E. DERECKTOR SHIPYARD
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Notes:

- 1 - Inhalation CSF = Unit Risk * 70 kg / 20m³/day.
- 2 - Trichloroethene, vinyl chloride, carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).
- 3 - See text for a discussion of trichloroethene toxicity.
- 4 - Values are for hexavalent chromium.

Definitions:

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System.

NA = Not Available.

Cal EPA = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

PPRTV = Provisional Peer Reviewed Toxicity Value.

RAGS Part D Table 7

Calculation of Cancer Risks and Non-Cancer Hazards

North Waterfront

LIST OF TABLES
RAGS PART D TABLE 7 - NORTH WATERFRONT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.

Reasonable Maximum Exposures

7.1.RME	Current Adolescent Trespassers - North Waterfront
7.2.RME	Current Adult Trespassers - North Waterfront
7.3.RME	Current Industrial Workers - North Waterfront
7.4.RME	Future Adolescent Trespassers - North Waterfront
7.5.RME	Future Adult Trespassers - North Waterfront
7.6.RME	Future Industrial Workers - North Waterfront
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - North Waterfront
7.9.RME	Hypothetical Adult Residents - North Waterfront

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.232	mg/kg	2.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.9E-08	6.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.165	mg/kg	1.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.4E-07	4.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.263	mg/kg	3.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.2E-08	6.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.238	mg/kg	2.7E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	2.0E-10	6.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.0E-07	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.099	mg/kg	1.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.1E-09	2.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	10.8	mg/kg	1.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	6.1E-07	2.8E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0009	
				Cobalt	6.98	mg/kg	2.6E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.006	
				Iron	18,800	mg/kg	7.1E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.007	
				Manganese	229	mg/kg	8.6E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.0E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003	
			Exp. Route Total								9.0E-07					0.02	
			Dermal	Benzo(a)anthracene	0.232	mg/kg	7.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.5E-08	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.165	mg/kg	5.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.9E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.263	mg/kg	6.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.2E-08	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.238	mg/kg	7.7E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	5.6E-10	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	4.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.9E-07	9.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.099	mg/kg	3.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.3E-08	7.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	10.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	6.98	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	18,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								8.2E-07					--	
			Exposure Point Total									1.7E-06					0.02
			Exposure Medium Total									1.7E-06					0.02
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	2.1E-11	mg/m³	2.0E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.2E-14	4.6E-13	(mg/m³)	NA	(mg/m³)	--	
				Benzo(a)pyrene	1.5E-11	mg/m³	1.4E-13	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	1.5E-13	3.3E-13	(mg/m³)	NA	(mg/m³)	--	
				Benzo(b)fluoranthene	2.4E-11	mg/m³	2.2E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.5E-14	5.2E-13	(mg/m³)	NA	(mg/m³)	--	
				Chrysene	2.2E-11	mg/m³	2.0E-13	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	2.2E-15	4.7E-13	(mg/m³)	NA	(mg/m³)	--	
				Dibenzo(a,h)anthracene	1.1E-11	mg/m³	1.1E-13	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	1.3E-13	2.5E-13	(mg/m³)	NA	(mg/m³)	--	
				Indeno(1,2,3-cd)pyrene	9.0E-12	mg/m³	8.5E-14	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	9.3E-15	2.0E-13	(mg/m³)	NA	(mg/m³)	--	
				Chromium VI	9.8E-10	mg/m³	9.2E-12	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	7.7E-10	2.2E-11	(mg/m³)	1.0E-04	(mg/m³)	2.2E-7	
				Cobalt	6.3E-10	mg/m³	2.0E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	1.8E-11	1.4E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000002	
				Iron	1.7E-6	mg/m³	5.4E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.7E-06	(mg/m³)	NA	(mg/m³)	--	
				Manganese	2.1E-8	mg/m³	6.5E-11	(mg/m³)	NA	(ug/m³) ⁻¹	--	4.6E-10	(mg/m³)	5.0E-05	(mg/m³)	0.000009	
			Exp. Route Total								7.9E-10					0.00001	
			Exposure Point Total									7.9E-10					0.00001
			Exposure Medium Total									7.9E-10					0.00001
Medium Total											1.7E-06				0.02		
Total of Receptor Risks Across All Media											1.7E-06	Total of Receptor Hazards Across All Media					0.02

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.232	mg/kg	1.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	9.1E-09	4.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.165	mg/kg	8.9E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.5E-08	3.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.263	mg/kg	1.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.0E-08	4.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.238	mg/kg	1.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	9.3E-11	4.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	6.7E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.9E-08	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.099	mg/kg	5.3E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.9E-09	1.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	10.8	mg/kg	5.8E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	2.9E-07	2.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0007	
				Cobalt	6.98	mg/kg	3.7E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004	
				Iron	18,800	mg/kg	1.0E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.005	
				Manganese	229	mg/kg	1.2E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.3E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.002	
			Exp. Route Total								4.3E-07				0.01		
			Dermal	Benzo(a)anthracene	0.232	mg/kg	6.5E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.7E-09	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.165	mg/kg	4.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.4E-08	1.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.263	mg/kg	7.3E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.3E-09	2.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.238	mg/kg	6.6E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	4.8E-11	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	3.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.5E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.099	mg/kg	2.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.0E-09	9.6E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	10.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	6.98	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	18,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								7.1E-08				--		
			Exposure Point Total								5.0E-07				0.01		
			Exposure Medium Total								5.0E-07				0.01		
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	2.1E-11	mg/m³	1.3E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.5E-14	4.6E-13	(mg/m³)	NA	(mg/m³)	--	
				Benzo(a)pyrene	1.5E-11	mg/m³	9.4E-14	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	1.0E-13	3.3E-13	(mg/m³)	NA	(mg/m³)	--	
				Benzo(b)fluoranthene	2.4E-11	mg/m³	1.5E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.6E-14	5.2E-13	(mg/m³)	NA	(mg/m³)	--	
				Chrysene	2.2E-11	mg/m³	1.4E-13	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	1.5E-15	4.7E-13	(mg/m³)	NA	(mg/m³)	--	
				Dibenzo(a,h)anthracene	1.1E-11	mg/m³	7.1E-14	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	8.5E-14	2.5E-13	(mg/m³)	NA	(mg/m³)	--	
				Indeno(1,2,3-cd)pyrene	9.0E-12	mg/m³	5.6E-14	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	6.2E-15	2.0E-13	(mg/m³)	NA	(mg/m³)	--	
				Chromium VI	9.8E-10	mg/m³	6.1E-12	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	5.2E-10	2.2E-11	(mg/m³)	1.0E-04	(mg/m³)	2.2E-7	
				Cobalt	6.3E-10	mg/m³	4.0E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	3.6E-11	1.4E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000002	
				Iron	1.7E-6	mg/m³	1.1E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.7E-08	(mg/m³)	NA	(mg/m³)	--	
				Manganese	2.1E-8	mg/m³	1.3E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	4.6E-10	(mg/m³)	5.0E-05	(mg/m³)	0.000009	
			Exp. Route Total								5.5E-10				0.00001		
			Exposure Point Total								5.5E-10				0.00001		
			Exposure Medium Total								5.5E-10				0.00001		
			Medium Total								5.0E-07				0.01		
Total of Receptor Risks Across All Media											5.0E-07	Total of Receptor Hazards Across All Media					0.01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.232	mg/kg	8.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.9E-08	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.165	mg/kg	5.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.2E-07	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.263	mg/kg	9.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.7E-08	2.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.238	mg/kg	8.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	6.1E-10	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	4.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.2E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.099	mg/kg	3.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.5E-08	9.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	10.8	mg/kg	3.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.9E-06	1.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004	
				Cobalt	6.98	mg/kg	2.4E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Iron	18,800	mg/kg	6.6E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.8E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.03	
				Manganese	229	mg/kg	8.0E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.009	
			Exp. Route Total								2.8E-06					0.06	
			Dermal	Benzo(a)anthracene	0.232	mg/kg	7.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.1E-08	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.165	mg/kg	4.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.6E-07	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.263	mg/kg	7.9E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.8E-08	2.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.238	mg/kg	7.1E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	5.2E-10	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	3.7E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.7E-07	1.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.099	mg/kg	3.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.2E-08	8.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	10.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	6.98	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	18,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								7.6E-07					--	
			Exposure Point Total								3.5E-06					0.06	
			Exposure Medium Total								3.5E-06					0.06	
Air	North Waterfront	Inhalation	Benzo(a)anthracene	2.1E-11	mg/m ³	1.7E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.9E-13	4.8E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(a)pyrene	1.5E-11	mg/m ³	1.2E-12	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	1.3E-12	3.4E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(b)fluoranthene	2.4E-11	mg/m ³	1.9E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.1E-13	5.5E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Chrysene	2.2E-11	mg/m ³	1.8E-12	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	1.9E-14	4.9E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Dibenzo(a,h)anthracene	1.1E-11	mg/m ³	9.2E-13	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	1.1E-12	2.6E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Indeno(1,2,3-cd)pyrene	9.0E-12	mg/m ³	7.3E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	8.1E-14	2.1E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Chromium VI	9.8E-10	mg/m ³	8.0E-11	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	6.7E-09	2.2E-10	(mg/m ³)	1.0E-04	(mg/m ³)	0.000002		
			Cobalt	6.3E-10	mg/m ³	5.2E-11	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	4.7E-10	1.4E-10	(mg/m ³)	6.0E-06	(mg/m ³)	0.00002		
			Iron	1.7E-6	mg/m ³	1.4E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	3.9E-07	(mg/m ³)	NA	(mg/m ³)	--		
			Manganese	2.1E-8	mg/m ³	1.7E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.8E-09	(mg/m ³)	5.0E-05	(mg/m ³)	0.00010		
		Exp. Route Total								7.2E-09					0.0001		
		Exposure Point Total								7.2E-09					0.0001		
		Exposure Medium Total								7.2E-09					0.0001		
		Medium Total								3.5E-06					0.06		
Total of Receptor Risks Across All Media											3.5E-06	Total of Receptor Hazards Across All Media					0.06

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.207	mg/kg	2.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.7E-08	5.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.161	mg/kg	1.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.3E-07	4.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.251	mg/kg	2.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.1E-08	6.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	0.209	mg/kg	2.4E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.7E-10	5.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.124	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.0E-07	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	1.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	9.0E-09	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Chromium VI	13.5	mg/kg	1.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	7.6E-07	3.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001
				Cobalt	7.90	mg/kg	3.0E-07	(mg/kg/day) ⁻¹	NA	(mg/kg/day) ⁻¹	--	2.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.007
				Iron	17.425	mg/kg	6.5E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.6E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.007
			Exp. Route Total							1.0E-06					0.01	
			Dermal	Benzo(a)anthracene	0.207	mg/kg	6.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.9E-08	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.161	mg/kg	5.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.8E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.251	mg/kg	8.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.9E-08	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	0.209	mg/kg	6.7E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	4.9E-10	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--
		Dibenzo(a,h)anthracene		0.124	mg/kg	4.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.9E-07	9.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
			Indeno(1,2,3-cd)pyrene	0.109	mg/kg	3.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.6E-08	8.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
			Chromium VI	13.5	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
			Cobalt	7.90	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
			Iron	17.425	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
			Exp. Route Total							8.0E-07					--	
		Exposure Point Total									1.8E-06					0.01
		Exposure Medium Total									1.8E-06					0.01
Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.9E-11	mg/m³	1.8E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.9E-14	4.1E-13	(mg/m³)	NA	(mg/m³)	--	
			Benzo(a)pyrene	1.5E-11	mg/m³	1.4E-13	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	1.5E-13	3.2E-13	(mg/m³)	NA	(mg/m³)	--	
			Benzo(b)fluoranthene	2.3E-11	mg/m³	2.1E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.4E-14	5.0E-13	(mg/m³)	NA	(mg/m³)	--	
			Chrysene	1.9E-11	mg/m³	1.8E-13	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	2.0E-15	4.2E-13	(mg/m³)	NA	(mg/m³)	--	
			Dibenzo(a,h)anthracene	1.1E-11	mg/m³	1.1E-13	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	1.3E-13	2.5E-13	(mg/m³)	NA	(mg/m³)	--	
			Indeno(1,2,3-cd)pyrene	9.9E-12	mg/m³	9.3E-14	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.0E-14	2.2E-13	(mg/m³)	NA	(mg/m³)	--	
			Chromium VI	1.2E-9	mg/m³	1.2E-11	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	9.7E-10	2.7E-11	(mg/m³)	1.0E-04	(mg/m³)	2.7E-7	
			Cobalt	7.2E-10	mg/m³	2.2E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	2.0E-11	1.6E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000003	
			Iron	1.6E-6	mg/m³	5.0E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.5E-08	(mg/m³)	NA	(mg/m³)	--	
		Exp. Route Total							9.9E-10					0.000003		
		Exposure Point Total								9.9E-10					0.000003	
		Exposure Medium Total								9.9E-10					0.000003	
		Medium Total								1.8E-06					0.01	

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Benzo(a)pyrene	0.044	mg/kg	5.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.6E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.023	mg/kg	2.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.9E-08	6.1E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.510	mg/kg	2.8E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.0E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
				Chromium VI	11.0	mg/kg	1.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	6.2E-07	2.9E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0010
				Cobalt	8.68	mg/kg	3.3E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.008
				Iron	20.100	mg/kg	7.6E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.3E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.008
			Exp. Route Total								6.8E-07					0.02
			Dermal	Benzo(a)pyrene	0.044	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.0E-07	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.023	mg/kg	7.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.5E-08	1.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.510	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				Chromium VI	11.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				Cobalt	8.68	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Iron	20.100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
			Exp. Route Total								1.6E-07					--
		Exposure Point Total									8.3E-07					0.02
	Exposure Medium Total										8.3E-07					0.02
	Air	North Waterfront	Inhalation	Benzo(a)pyrene	4.0E-12	mg/m ³	3.8E-14	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	4.1E-14	8.8E-14	(mg/m ³)	NA	(mg/m ³)	--
				Dibenzo(a,h)anthracene	2.1E-12	mg/m ³	2.0E-14	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	2.4E-14	4.6E-14	(mg/m ³)	NA	(mg/m ³)	--
				Aluminum	6.8E-7	mg/m ³	2.1E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.5E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000003
				Chromium VI	1.0E-9	mg/m ³	9.4E-12	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	7.9E-10	2.2E-11	(mg/m ³)	1.0E-04	(mg/m ³)	2.2E-7
				Cobalt	7.9E-10	mg/m ³	2.5E-12	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	2.2E-11	1.7E-11	(mg/m ³)	6.0E-06	(mg/m ³)	0.000003
				Iron	1.8E-6	mg/m ³	5.7E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.0E-06	(mg/m ³)	NA	(mg/m ³)	--
			Exp. Route Total								8.1E-10					0.000006
		Exposure Point Total									8.1E-10					0.000006
	Exposure Medium Total										8.1E-10					0.000006
Medium Total											8.3E-07					0.02

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.207	mg/kg	1.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.1E-09	3.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.161	mg/kg	8.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.3E-08	3.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.251	mg/kg	1.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	9.8E-09	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.209	mg/kg	1.1E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	8.2E-11	3.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	6.7E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.9E-08	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	5.9E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.3E-09	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	13.5	mg/kg	7.2E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	3.6E-07	2.5E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0008	
				Cobalt	7.90	mg/kg	4.2E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005	
				Iron	17.425	mg/kg	9.4E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.3E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.005	
			Exp. Route Total							5.0E-07					0.01		
			Dermal	Benzo(a)anthracene	0.207	mg/kg	5.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.2E-09	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.161	mg/kg	4.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.3E-08	1.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.251	mg/kg	7.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.1E-09	2.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.209	mg/kg	5.8E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	4.2E-11	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	3.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.5E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	3.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.2E-09	1.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	13.5	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	7.90	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	17.425	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
			Exp. Route Total							6.9E-08					--		
			Exposure Point Total								5.7E-07					0.01	
		Exposure Medium Total									5.7E-07					0.01	
Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.9E-11	mg/m ³	1.2E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.3E-14	4.1E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(a)pyrene	1.5E-11	mg/m ³	9.2E-14	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	1.0E-13	3.2E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(b)fluoranthene	2.3E-11	mg/m ³	1.4E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.6E-14	5.0E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Chrysene	1.9E-11	mg/m ³	1.2E-13	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	1.3E-15	4.2E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Dibenzo(a,h)anthracene	1.1E-11	mg/m ³	7.1E-14	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	8.5E-14	2.5E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Indeno(1,2,3-cd)pyrene	9.9E-12	mg/m ³	6.2E-14	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	6.8E-15	2.2E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Chromium VI	1.2E-9	mg/m ³	7.7E-12	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	6.5E-10	2.7E-11	(mg/m ³)	1.0E-04	(mg/m ³)	2.7E-7		
			Cobalt	7.2E-10	mg/m ³	4.5E-12	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	4.0E-11	1.6E-11	(mg/m ³)	6.0E-06	(mg/m ³)	0.000003		
			Iron	1.6E-6	mg/m ³	9.9E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	3.5E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Exp. Route Total							6.9E-10					0.000003		
			Exposure Point Total								6.9E-10					0.000003	
		Exposure Medium Total									6.9E-10					0.000003	
		Medium Total										5.7E-07				0.01	

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Benzo(a)pyrene	0.044	mg/kg	2.4E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.7E-08	8.3E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.023	mg/kg	1.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	9.1E-09	4.4E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	7,510	mg/kg	4.0E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.001	
				Chromium VI	11.0	mg/kg	5.9E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	3.0E-07	2.1E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0007	
				Cobalt	8.68	mg/kg	4.7E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005	
				Iron	20,100	mg/kg	1.1E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.8E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.005	
			Exp. Route Total								3.2E-07					0.01	
			Dermal	Benzo(a)pyrene	0.044	mg/kg	1.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	8.9E-09	4.3E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.023	mg/kg	6.5E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.7E-09	2.3E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	7,510	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Chromium VI	11.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	8.68	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	20,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
			Exp. Route Total								1.4E-08					--	
		Exposure Point Total									3.4E-07					0.01	
	Exposure Medium Total									3.4E-07					0.01		
	Air	North Waterfront	Inhalation	Benzo(a)pyrene	4.0E-12	mg/m ³	2.5E-14	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	2.8E-14	8.8E-14	(mg/m ³)	NA	(mg/m ³)	--	
				Dibenzo(a,h)anthracene	2.1E-12	mg/m ³	1.3E-14	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	1.6E-14	4.6E-14	(mg/m ³)	NA	(mg/m ³)	--	
				Aluminum	6.8E-7	mg/m ³	4.3E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.5E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000003	
				Chromium VI	1.0E-9	mg/m ³	6.3E-12	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	5.3E-10	2.2E-11	(mg/m ³)	1.0E-04	(mg/m ³)	2.2E-7	
				Cobalt	7.9E-10	mg/m ³	4.9E-12	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	4.4E-11	1.7E-11	(mg/m ³)	6.0E-06	(mg/m ³)	0.000003	
				Iron	1.8E-6	mg/m ³	1.1E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.0E-08	(mg/m ³)	NA	(mg/m ³)	--	
			Exp. Route Total								5.7E-10					0.000006	
		Exposure Point Total									5.7E-10					0.000006	
	Exposure Medium Total									5.7E-10					0.000006		
	Medium Total									3.4E-07					0.01		

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.207	mg/kg	7.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.3E-08	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.161	mg/kg	5.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.1E-07	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.251	mg/kg	8.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.4E-08	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.209	mg/kg	7.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	5.3E-10	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	4.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.2E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	3.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.8E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	13.5	mg/kg	4.7E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	2.4E-06	1.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004	
				Cobalt	7.90	mg/kg	2.8E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03	
				Iron	17.425	mg/kg	6.1E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.02	
				Exp. Route Total							3.2E-06					0.05	
			Dermal	Benzo(a)anthracene	0.207	mg/kg	6.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.5E-08	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.161	mg/kg	4.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.5E-07	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.251	mg/kg	7.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.5E-08	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.209	mg/kg	6.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	4.6E-10	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	3.7E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.7E-07	1.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	3.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.4E-08	9.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	13.5	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	7.90	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	17.425	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Exp. Route Total							7.5E-07					--	
				Exposure Point Total							4.0E-06					0.05	
				Exposure Medium Total							4.0E-06					0.05	
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.9E-11	mg/m ³	1.5E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.7E-13	4.3E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(a)pyrene	1.5E-11	mg/m ³	1.2E-12	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	1.3E-12	3.3E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(b)fluoranthene	2.3E-11	mg/m ³	1.9E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.0E-13	5.2E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Chrysene	1.9E-11	mg/m ³	1.5E-12	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	1.7E-14	4.3E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Dibenzo(a,h)anthracene	1.1E-11	mg/m ³	9.2E-13	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	1.1E-12	2.6E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Indeno(1,2,3-cd)pyrene	9.9E-12	mg/m ³	8.1E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	8.9E-14	2.3E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Chromium VI	1.2E-9	mg/m ³	1.0E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	8.4E-09	2.8E-10	(mg/m ³)	1.0E-04	(mg/m ³)	0.000003	
				Cobalt	7.2E-10	mg/m ³	5.9E-11	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	5.3E-10	1.6E-10	(mg/m ³)	6.0E-06	(mg/m ³)	0.00003	
				Iron	1.6E-6	mg/m ³	1.3E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	3.6E-07	(mg/m ³)	NA	(mg/m ³)	--	
				Exp. Route Total							8.9E-09					0.00003	
				Exposure Point Total							8.9E-09					0.00003	
				Exposure Medium Total							8.9E-09					0.00003	
				Medium Total							4.0E-06					0.05	
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Benzo(a)pyrene	0.044	mg/kg	1.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.1E-07	4.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.023	mg/kg	8.1E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.9E-08	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	7.510	mg/kg	2.6E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.007	
				Chromium VI	11.0	mg/kg	3.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.9E-06	1.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004	
				Cobalt	8.68	mg/kg	3.0E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03	
				Iron	20,100	mg/kg	7.0E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.0E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.03	
				Exp. Route Total							2.1E-06					0.07	
			Dermal	Benzo(a)pyrene	0.044	mg/kg	1.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	9.6E-08	3.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.023	mg/kg	7.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.1E-08	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	7.510	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Chromium VI	11.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	8.68	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	20,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Exp. Route Total							1.5E-07					--	
				Exposure Point Total							2.2E-06					0.07	
				Exposure Medium Total							2.2E-06					0.07	

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Air	North Waterfront	Inhalation	Benzo(a)pyrene	4.0E-12	mg/m³	3.3E-13	(mg/m³)	1.1E-03	(ug/m³)⁻¹	3.6E-13	9.1E-13	(mg/m³)	NA	(mg/m³)	--
				Dibenzo(a,h)anthracene	2.1E-12	mg/m³	1.7E-13	(mg/m³)	1.2E-03	(ug/m³)⁻¹	2.1E-13	4.8E-13	(mg/m³)	NA	(mg/m³)	--
				Aluminum	6.8E-7	mg/m³	5.6E-08	(mg/m³)	NA	(ug/m³)⁻¹	--	1.6E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00003
				Chromium VI	1.0E-9	mg/m³	8.2E-11	(mg/m³)	8.4E-02	(ug/m³)⁻¹	6.8E-09	2.3E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000002
				Cobalt	7.9E-10	mg/m³	6.4E-11	(mg/m³)	9.0E-03	(ug/m³)⁻¹	5.8E-10	1.8E-10	(mg/m³)	6.0E-06	(mg/m³)	0.00003
				Iron	1.8E-6	mg/m³	1.5E-07	(mg/m³)	NA	(ug/m³)⁻¹	--	4.2E-07	(mg/m³)	NA	(mg/m³)	--
				Exp. Route Total						7.4E-09						0.00006
		Exposure Point Total						7.4E-09						0.00006		
	Exposure Medium Total							7.4E-09						0.00006		
	Medium Total							2.2E-06						0.07		
Groundwater	Groundwater	North Waterfront	Ingestion	cis-1,2-Dichloroethene	4.26	ug/L	1.5E-05	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	4.2E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.02
				Trichloroethene	12.2	ug/L	4.3E-05	(mg/kg/day)	4.6E-02	(mg/kg/day)⁻¹	2.0E-06	1.2E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.2
				Vinyl Chloride	1.47	ug/L	5.1E-06	(mg/kg/day)	7.2E-01	(mg/kg/day)⁻¹	3.7E-06	1.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
				Aluminum	337	ug/L	1.2E-03	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	3.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
				Chromium VI	0.508	ug/L	1.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)⁻¹	8.9E-07	5.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
				Iron	605	ug/L	2.1E-03	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	5.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.008
				Manganese	53.9	ug/L	1.9E-04	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	5.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
				Exp. Route Total						6.5E-06						0.3
			Dermal	cis-1,2-Dichloroethene	4.26	ug/L	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	4.8E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0002
				Trichloroethene	12.2	ug/L	6.7E-07	(mg/kg/day)	4.6E-02	(mg/kg/day)⁻¹	3.1E-08	1.9E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.004
				Vinyl Chloride	1.47	ug/L	2.5E-08	(mg/kg/day)	7.2E-01	(mg/kg/day)⁻¹	1.8E-08	6.9E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00002
				Aluminum	337	ug/L	5.3E-07	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	1.5E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000001
				Chromium VI	0.508	ug/L	1.6E-09	(mg/kg/day)	2.0E+01	(mg/kg/day)⁻¹	3.2E-08	4.5E-09	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.00006
				Iron	605	ug/L	9.6E-07	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	2.7E-06	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.000004
				Manganese	53.9	ug/L	8.5E-08	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	2.4E-07	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.0002
				Exp. Route Total						8.1E-08						0.004
		Exposure Point Total						6.6E-06						0.3		
	Exposure Medium Total							6.6E-06						0.3		
	Medium Total							6.6E-06						0.3		
Total Cancer Risks for Surface Soil and Groundwater										1.1E-05	Total Hazard Indices for Surface Soil and Groundwater					0.4
Total Cancer Risks for Subsurface Soil and Groundwater										8.9E-06	Total Hazard Indices for Subsurface Soil and Groundwater					0.4

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.207	mg/kg	5.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.6E-09	3.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.161	mg/kg	3.9E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.8E-08	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.251	mg/kg	6.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.4E-09	4.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.209	mg/kg	5.0E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	3.7E-11	3.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	3.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.2E-08	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	2.6E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.9E-09	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	13.5	mg/kg	3.2E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.6E-07	2.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.001	
				Cobalt	7.90	mg/kg	1.9E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004	
				Iron	17.425	mg/kg	4.2E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.9E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04	
			Exp. Route Total							2.2E-07					0.05		
			Dermal	Benzo(a)anthracene	0.207	mg/kg	1.9E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.4E-09	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.161	mg/kg	1.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.1E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.251	mg/kg	2.3E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.7E-09	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.209	mg/kg	2.0E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.4E-11	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	1.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	8.5E-09	8.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	1.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.4E-10	7.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	13.5	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--	
				Cobalt	7.90	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--	
				Iron	17.425	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Exp. Route Total							2.3E-08					--	
			Exposure Point Total								2.5E-07					0.05	
		Exposure Medium Total									2.5E-07					0.05	
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.5E-7	mg/m ³	2.5E-10	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.8E-11	1.8E-08	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(a)pyrene	1.2E-7	mg/m ³	2.0E-10	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	2.1E-10	1.4E-08	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(b)fluoranthene	1.8E-7	mg/m ³	3.0E-10	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	3.3E-11	2.1E-08	(mg/m ³)	NA	(mg/m ³)	--	
				Chrysene	1.5E-7	mg/m ³	2.5E-10	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	2.8E-12	1.8E-08	(mg/m ³)	NA	(mg/m ³)	--	
				Dibenzo(a,h)anthracene	8.9E-8	mg/m ³	1.5E-10	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	1.8E-10	1.1E-08	(mg/m ³)	NA	(mg/m ³)	--	
				Indeno(1,2,3-cd)pyrene	7.8E-8	mg/m ³	1.3E-10	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.5E-11	9.2E-09	(mg/m ³)	NA	(mg/m ³)	--	
				Chromium VI	9.6E-6	mg/m ³	1.6E-08	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.4E-06	1.1E-06	(mg/m ³)	1.0E-04	(mg/m ³)	0.01	
				Cobalt	5.6E-6	mg/m ³	9.6E-09	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	8.6E-08	6.7E-07	(mg/m ³)	2.0E-05	(mg/m ³)	0.03	
				Iron	0.012	mg/m ³	2.1E-05	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.5E-03	(mg/m ³)	NA	(mg/m ³)	--	
				Exp. Route Total							1.5E-06					0.04	
			Exposure Point Total								1.5E-06					0.04	
		Exposure Medium Total									1.5E-06					0.04	
Medium Total											1.7E-06				0.09		
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Benzo(a)pyrene	0.044	mg/kg	1.1E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	7.7E-09	7.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.023	mg/kg	5.8E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.1E-09	3.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	7.510	mg/kg	1.8E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01	
				Chromium VI	11.0	mg/kg	2.6E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.3E-07	1.8E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0009	
				Cobalt	8.68	mg/kg	2.1E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005	
				Iron	20,100	mg/kg	4.8E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.05	
				Exp. Route Total							1.4E-07					0.07	
			Dermal	Benzo(a)pyrene	0.044	mg/kg	4.1E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.0E-09	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.023	mg/kg	2.2E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.6E-09	1.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	7.510	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Chromium VI	11.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--	
				Cobalt	8.68	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--	
				Iron	20,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Exp. Route Total							4.6E-09					--	
			Exposure Point Total								1.5E-07					0.07	
	Exposure Medium Total										1.5E-07				0.07		

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient		
							Value	Units	Value	Units		Value	Units	Value	Units			
Subsurface Soil	Air	North Waterfront	Inhalation	Benzo(a)pyrene	3.1E-8	mg/m³	5.3E-11	(mg/m³)	1.1E-03	(ug/m³)⁻¹	5.9E-11	3.7E-09	(mg/m³)	NA	(mg/m³)	--		
				Dibenzo(a,h)anthracene	1.7E-8	mg/m³	2.8E-11	(mg/m³)	1.2E-03	(ug/m³)⁻¹	3.4E-11	2.0E-09	(mg/m³)	NA	(mg/m³)	--		
				Aluminum	0.005	mg/m³	9.1E-06	(mg/m³)	NA	(ug/m³)⁻¹	--	6.4E-04	(mg/m³)	5.0E-03	(mg/m³)	0.1		
				Chromium VI	7.9E-6	mg/m³	1.3E-08	(mg/m³)	8.4E-02	(ug/m³)⁻¹	1.1E-06	9.3E-07	(mg/m³)	1.0E-04	(mg/m³)	0.009		
				Cobalt	6.2E-6	mg/m³	1.1E-08	(mg/m³)	9.0E-03	(ug/m³)⁻¹	9.5E-08	7.4E-07	(mg/m³)	2.0E-05	(mg/m³)	0.04		
				Iron	0.014	mg/m³	2.4E-05	(mg/m³)	NA	(ug/m³)⁻¹	--	1.7E-03	(mg/m³)	NA	(mg/m³)	--		
				Exp. Route Total							1.2E-06					0.2		
				Exposure Point Total							1.2E-06					0.2		
				Exposure Medium Total							1.2E-06					0.2		
			Medium Total							1.4E-06					0.2			
Groundwater	Groundwater	North Waterfront	Ingestion	cis-1,2-Dichloroethene	4.26	ug/L	1.5E-08	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	1.1E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00005		
				Trichloroethene	12.2	ug/L	4.4E-08	(mg/kg/day)	4.6E-02	(mg/kg/day)⁻¹	2.0E-09	3.1E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.006		
				Vinyl Chloride	1.47	ug/L	5.3E-09	(mg/kg/day)	7.2E-01	(mg/kg/day)⁻¹	3.8E-09	3.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001		
				Aluminum	337	ug/L	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	8.6E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00009		
				Chromium VI	0.508	ug/L	1.8E-09	(mg/kg/day)	5.0E-01	(mg/kg/day)⁻¹	9.2E-10	1.3E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000006		
				Iron	605	ug/L	2.2E-06	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	1.5E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0002		
				Manganese	53.9	ug/L	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	1.4E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.0006		
				Exp. Route Total							6.8E-09					0.008		
				Dermal	cis-1,2-Dichloroethene	4.26	ug/L	9.4E-08	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	6.6E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0003	
			Trichloroethene		12.2	ug/L	3.0E-07	(mg/kg/day)	4.6E-02	(mg/kg/day)⁻¹	1.4E-06	2.1E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.04		
			Vinyl Chloride		1.47	ug/L	1.6E-08	(mg/kg/day)	7.2E-01	(mg/kg/day)⁻¹	1.2E-08	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004		
			Aluminum		337	ug/L	6.5E-07	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	4.5E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00005		
			Chromium VI		0.508	ug/L	1.9E-09	(mg/kg/day)	2.0E+01	(mg/kg/day)⁻¹	3.9E-08	1.4E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0003		
			Iron		605	ug/L	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	8.1E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0001		
			Manganese		53.9	ug/L	1.0E-07	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	7.2E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.008		
			Exp. Route Total								6.5E-08					0.05		
			Exposure Point Total								7.2E-08					0.06		
			Exposure Medium Total								7.2E-08					0.06		
			Air	North Waterfront	Inhalation	cis-1,2-Dichloroethene	1.6E-4	mg/m³	2.7E-07	(mg/m³)	NA	(ug/m³)⁻¹	--	1.9E-05	(mg/m³)	NA	(mg/m³)	--
						Trichloroethene	3.9E-4	mg/m³	6.7E-07	(mg/m³)	4.1E-06	(ug/m³)⁻¹	2.7E-09	4.7E-05	(mg/m³)	5.4E-01	(mg/m³)	0.00009
	Vinyl Chloride	6.9E-5				mg/m³	1.2E-07	(mg/m³)	4.4E-06	(ug/m³)⁻¹	5.1E-10	8.2E-06	(mg/m³)	7.7E-02	(mg/m³)	0.0001		
	Aluminum	0.0E+0				mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-03	(mg/m³)	--		
	Chromium VI	0.0E+0				mg/m³	0.0E+00	(mg/m³)	8.4E-02	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	1.0E-04	(mg/m³)	--		
	Iron	0.0E+0				mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	NA	(mg/m³)	--		
	Manganese	0.0E+0				mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-05	(mg/m³)	--		
	Exp. Route Total										3.2E-09					0.0002		
	Exposure Point Total										3.2E-09					0.0002		
	Exposure Medium Total										3.2E-09					0.0002		
	Medium Total									7.5E-08					0.06			
	Total Cancer Risks for Surface Soil and Groundwater										Total Hazard Indices for Surface Soil and Groundwater			0.2				
	Total Cancer Risks for Subsurface Soil and Groundwater										Total Hazard Indices for Subsurface Soil and Groundwater			0.3				

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.207	mg/kg	1.2E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.8E-07	2.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.161	mg/kg	9.4E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.9E-06	2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.251	mg/kg	1.5E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.1E-06	3.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	0.209	mg/kg	1.2E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	8.9E-09	2.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.124	mg/kg	7.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.3E-06	1.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	6.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.7E-07	1.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Chromium VI	13.5	mg/kg	7.9E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	3.9E-05	1.7E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.06
				Cobalt	7.90	mg/kg	8.7E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.0E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.3
				Iron	17,425	mg/kg	1.9E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.2E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.3
				Exp. Route Total							5.4E-05					0.7
			Dermal	Benzo(a)anthracene	0.207	mg/kg	4.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.2E-07	9.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.161	mg/kg	3.4E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.5E-06	7.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.251	mg/kg	5.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.9E-07	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	0.209	mg/kg	4.4E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	3.2E-09	9.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.124	mg/kg	2.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.9E-06	5.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	2.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.7E-07	5.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Chromium VI	13.5	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				Cobalt	7.90	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Iron	17,425	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				Exp. Route Total							5.3E-06					--
			Exposure Point Total								5.9E-05					0.7
		Exposure Medium Total								5.9E-05					0.7	
Air	Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.9E-11	mg/m ³	8.2E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	9.1E-13	1.8E-11	(mg/m ³)	NA	(mg/m ³)	--
				Benzo(a)pyrene	1.5E-11	mg/m ³	6.4E-12	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	7.1E-12	1.4E-11	(mg/m ³)	NA	(mg/m ³)	--
				Benzo(b)fluoranthene	2.3E-11	mg/m ³	1.0E-11	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.1E-12	2.2E-11	(mg/m ³)	NA	(mg/m ³)	--
				Chrysene	1.9E-11	mg/m ³	8.3E-12	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	9.2E-14	1.8E-11	(mg/m ³)	NA	(mg/m ³)	--
				Dibenzo(a,h)anthracene	1.1E-11	mg/m ³	4.9E-12	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	5.9E-12	1.1E-11	(mg/m ³)	NA	(mg/m ³)	--
				Indeno(1,2,3-cd)pyrene	9.9E-12	mg/m ³	4.3E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	4.8E-13	9.5E-12	(mg/m ³)	NA	(mg/m ³)	--
				Chromium VI	1.2E-9	mg/m ³	5.4E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	4.5E-08	1.2E-09	(mg/m ³)	1.0E-04	(mg/m ³)	0.00001
				Cobalt	7.2E-10	mg/m ³	5.9E-11	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	5.3E-10	6.9E-10	(mg/m ³)	6.0E-06	(mg/m ³)	0.0001
				Iron	1.6E-6	mg/m ³	1.3E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.5E-06	(mg/m ³)	NA	(mg/m ³)	--
				Exp. Route Total							4.6E-08					0.0001
			Exposure Point Total								4.6E-08					0.0001
		Exposure Medium Total								4.6E-08					0.0001	
Medium Total								5.9E-05					0.7			
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Benzo(a)pyrene	0.044	mg/kg	2.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.9E-06	5.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.023	mg/kg	1.4E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	9.9E-07	3.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7,510	mg/kg	8.2E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.6E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.10
				Chromium VI	11.0	mg/kg	6.4E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	3.2E-05	1.4E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.05
				Cobalt	8.68	mg/kg	9.5E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.1E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.4
				Iron	20,100	mg/kg	2.2E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.6E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.4
				Exp. Route Total							3.5E-05					0.9
			Dermal	Benzo(a)pyrene	0.044	mg/kg	9.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.8E-07	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.023	mg/kg	5.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.6E-07	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7,510	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				Chromium VI	11.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				Cobalt	8.68	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Iron	20,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				Exp. Route Total							1.0E-06					--
			Exposure Point Total								3.6E-05					0.9
		Exposure Medium Total								3.6E-05					0.9	

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DEREKOTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Air	North Waterfront	Inhalation	Benzo(a)pyrene	4.0E-12	mg/m³	1.8E-12	(mg/m³)	1.1E-03	(ug/m³)⁻¹	1.9E-12	3.8E-12	(mg/m³)	NA	(mg/m³)	--	
				Dibenzo(a,h)anthracene	2.1E-12	mg/m³	9.3E-13	(mg/m³)	1.2E-03	(ug/m³)⁻¹	1.1E-12	2.0E-12	(mg/m³)	NA	(mg/m³)	--	
				Aluminum	6.8E-7	mg/m³	5.6E-08	(mg/m³)	NA	(ug/m³)⁻¹	--	6.5E-07	(mg/m³)	5.0E-03	(mg/m³)	0.0001	
				Chromium VI	1.0E-9	mg/m³	4.4E-10	(mg/m³)	8.4E-02	(ug/m³)⁻¹	3.7E-08	9.6E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000010	
				Cobalt	7.9E-10	mg/m³	6.5E-11	(mg/m³)	9.0E-03	(ug/m³)⁻¹	5.8E-10	7.6E-10	(mg/m³)	6.0E-06	(mg/m³)	0.0001	
				Iron	1.8E-6	mg/m³	1.5E-07	(mg/m³)	NA	(ug/m³)⁻¹	--	1.8E-06	(mg/m³)	NA	(mg/m³)	--	
				Exp. Route Total							3.7E-08					0.0003	
				Exposure Point Total							3.7E-08					0.0003	
				Exposure Medium Total							3.7E-08					0.0003	
		Medium Total							3.6E-05						0.9		
Groundwater	Groundwater	North Waterfront	Ingestion	cis-1,2-Dichloroethene	4.26	ug/L	2.3E-05	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	2.7E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.1	
				Trichloroethene (Mutagenic)	12.2	ug/L	3.6E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)⁻¹	3.3E-06	7.8E-04	(mg/kg/day)	NA	(mg/kg/day)	--	
				Trichloroethene (Nonmutagenic)	12.2	ug/L	6.7E-05	(mg/kg/day)	3.7E-02	(mg/kg/day)⁻¹	2.5E-06	7.8E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.6	
				Vinyl Chloride	1.47	ug/L	1.1E-04	(mg/kg/day)	7.2E-01	(mg/kg/day)⁻¹	7.6E-05	9.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.03	
				Aluminum	337	ug/L	1.8E-03	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	2.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02	
				Chromium VI	0.508	ug/L	1.5E-05	(mg/kg/day)	5.0E-01	(mg/kg/day)⁻¹	7.4E-06	3.2E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01	
				Iron	605	ug/L	3.3E-03	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	3.9E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06	
				Manganese	53.9	ug/L	3.0E-04	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	3.4E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.1	
				Exp. Route Total							9.0E-05					2.0	
			Dermal	cis-1,2-Dichloroethene	4.26	ug/L	2.9E-06	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	3.4E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.02	
				Trichloroethene (Mutagenic)	12.2	ug/L	5.8E-05	(mg/kg/day)	9.3E-03	(mg/kg/day)⁻¹	5.4E-07	1.3E-04	(mg/kg/day)	NA	(mg/kg/day)	--	
				Trichloroethene (Nonmutagenic)	12.2	ug/L	1.1E-05	(mg/kg/day)	3.7E-02	(mg/kg/day)⁻¹	4.0E-07	1.3E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.3	
				Vinyl Chloride	1.47	ug/L	5.8E-06	(mg/kg/day)	7.2E-01	(mg/kg/day)⁻¹	4.1E-06	5.1E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002	
				Aluminum	337	ug/L	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	1.4E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0001	
				Chromium VI	0.508	ug/L	2.0E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)⁻¹	3.9E-06	4.3E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.006	
				Iron	605	ug/L	2.2E-05	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	2.6E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0004	
				Manganese	53.9	ug/L	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	2.3E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.02	
				Exp. Route Total							9.0E-06					0.3	
				Exposure Point Total							9.0E-05					2.3	
				Exposure Medium Total							9.9E-05					2.3	
	Air	North Waterfront	Inhalation	cis-1,2-Dichloroethene	0.002	mg/m³	1.8E-04	(mg/m³)	NA	(ug/m³)⁻¹	--	2.0E-03	(mg/m³)	NA	(mg/m³)	--	
				Trichloroethene (Mutagenic)	0.006	mg/m³	2.7E-03	(mg/m³)	1.0E-06	(ug/m³)⁻¹	2.7E-06	5.8E-03	(mg/m³)	NA	(mg/m³)	--	
				Trichloroethene (Nonmutagenic)	0.006	mg/m³	5.0E-04	(mg/m³)	3.1E-06	(ug/m³)⁻¹	1.6E-06	5.8E-03	(mg/m³)	2.0E-03	(mg/m³)	2.9	
				Vinyl Chloride	7.4E-4	mg/m³	8.0E-04	(mg/m³)	4.4E-06	(ug/m³)⁻¹	3.5E-06	7.0E-04	(mg/m³)	1.0E-01	(mg/m³)	0.007	
				Aluminum	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-03	(mg/m³)	--	
				Chromium VI	0.0E+0	mg/m³	0.0E+00	(mg/m³)	8.4E-02	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	1.0E-04	(mg/m³)	--	
				Iron	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	NA	(mg/m³)	--	
				Manganese	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-05	(mg/m³)	--	
				Exp. Route Total							7.7E-06					2.9	
				Exposure Point Total							7.7E-06					2.9	
				Exposure Medium Total							7.7E-06					2.9	
				Medium Total							1.1E-04					5.2	
				Total Cancer Risks for Surface Soil and Groundwater							1.7E-04	Total Hazard Indices for Surface Soil and Groundwater					5.9
				Total Cancer Risks for Subsurface Soil and Groundwater							1.4E-04	Total Hazard Indices for Subsurface Soil and Groundwater					6.1

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early Life Exposure to Carcinogens (2005).

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Benzo(a)anthracene	0.207	mg/kg	1.8E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.3E-07	2.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.161	mg/kg	1.4E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.0E-06	2.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.251	mg/kg	2.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.6E-07	3.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.209	mg/kg	1.8E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.3E-09	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	1.1E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	7.8E-07	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	9.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.9E-08	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	13.5	mg/kg	1.2E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	5.8E-06	1.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006	
				Cobalt	7.90	mg/kg	3.7E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04	
				Iron	17.425	mg/kg	8.2E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.03	
				Exp. Route Total							8.0E-06					0.08	
			Dermal	Benzo(a)anthracene	0.207	mg/kg	9.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.7E-08	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.161	mg/kg	7.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.2E-07	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.251	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.2E-08	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.209	mg/kg	9.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	6.8E-10	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.124	mg/kg	5.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.0E-07	8.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.109	mg/kg	4.9E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.6E-08	7.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chromium VI	13.5	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	7.90	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	17.425	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Exp. Route Total							1.1E-06					--	
			Exposure Point Total								9.1E-06					0.08	
		Exposure Medium Total									9.1E-06				0.08		
	Air	North Waterfront	Inhalation	Benzo(a)anthracene	1.9E-11	mg/m ³	1.1E-11	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.2E-12	1.8E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(a)pyrene	1.5E-11	mg/m ³	8.8E-12	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	9.7E-12	1.4E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(b)fluoranthene	2.3E-11	mg/m ³	1.4E-11	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.5E-12	2.2E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Chrysene	1.9E-11	mg/m ³	1.1E-11	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	1.3E-13	1.8E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Dibenzo(a,h)anthracene	1.1E-11	mg/m ³	6.8E-12	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	8.2E-12	1.1E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Indeno(1,2,3-cd)pyrene	9.9E-12	mg/m ³	6.0E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	6.6E-13	9.5E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Chromium VI	1.2E-9	mg/m ³	7.4E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	6.2E-08	1.2E-09	(mg/m ³)	1.0E-04	(mg/m ³)	0.00001	
				Cobalt	7.2E-10	mg/m ³	2.4E-10	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	2.1E-09	6.9E-10	(mg/m ³)	6.0E-06	(mg/m ³)	0.0001	
				Iron	1.6E-6	mg/m ³	5.2E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.5E-06	(mg/m ³)	NA	(mg/m ³)	--	
				Exp. Route Total							6.4E-08					0.0001	
			Exposure Point Total								6.4E-08					0.0001	
		Exposure Medium Total									6.4E-08				0.0001		
Medium Total											9.1E-06			0.08			
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Benzo(a)pyrene	0.044	mg/kg	3.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.8E-07	6.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.023	mg/kg	2.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.5E-07	3.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	7.510	mg/kg	3.5E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01	
				Chromium VI	11.0	mg/kg	9.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	4.7E-06	1.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005	
				Cobalt	8.68	mg/kg	4.1E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04	
				Iron	20.100	mg/kg	9.4E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.8E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04	
				Exp. Route Total							5.2E-06					0.09	
			Dermal	Benzo(a)pyrene	0.044	mg/kg	2.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.4E-07	3.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.023	mg/kg	1.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	7.6E-08	1.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	7.510	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Chromium VI	11.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	8.68	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	20.100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Exp. Route Total							2.2E-07					--	
			Exposure Point Total								5.4E-06					0.09	
	Exposure Medium Total									5.4E-06				0.09			

TABLE 7.9 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Air	North Waterfront	Inhalation	Benzo(a)pyrene	4.0E-12	mg/m³	2.4E-12	(mg/m³)	1.1E-03	(ug/m³)⁻¹	2.7E-12	3.8E-12	(mg/m³)	NA	(mg/m³)	--	
				Dibenzo(a,h)anthracene	2.1E-12	mg/m³	1.3E-12	(mg/m³)	1.2E-03	(ug/m³)⁻¹	1.5E-12	2.0E-12	(mg/m³)	NA	(mg/m³)	--	
				Aluminum	6.8E-7	mg/m³	2.2E-07	(mg/m³)	NA	(ug/m³)⁻¹	--	6.5E-07	(mg/m³)	5.0E-03	(mg/m³)	0.0001	
				Chromium VI	1.0E-9	mg/m³	6.0E-10	(mg/m³)	8.4E-02	(ug/m³)⁻¹	5.1E-08	9.6E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000010	
				Cobalt	7.9E-10	mg/m³	2.6E-10	(mg/m³)	9.0E-03	(ug/m³)⁻¹	2.3E-09	7.6E-10	(mg/m³)	6.0E-06	(mg/m³)	0.0001	
				Iron	1.8E-6	mg/m³	6.0E-07	(mg/m³)	NA	(ug/m³)⁻¹	--	1.8E-06	(mg/m³)	NA	(mg/m³)	--	
				Exp. Route Total							5.3E-08					0.0003	
				Exposure Point Total							5.3E-08					0.0003	
				Exposure Medium Total							5.3E-08					0.0003	
			Medium Total							5.4E-06						0.09	
Groundwater	Groundwater	North Waterfront	Ingestion	cis-1,2-Dichloroethene	4.26	ug/L	4.0E-05	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	1.2E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.06	
				Trichloroethene (Mutagenic)	12.2	ug/L	2.1E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)⁻¹	2.0E-06	3.3E-04	(mg/kg/day)	NA	(mg/kg/day)	--	
				Trichloroethene (Nonmutagenic)	12.2	ug/L	1.1E-04	(mg/kg/day)	3.7E-02	(mg/kg/day)⁻¹	4.2E-06	3.3E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.7	
				Vinyl Chloride	1.47	ug/L	1.4E-05	(mg/kg/day)	7.2E-01	(mg/kg/day)⁻¹	9.9E-06	4.0E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01	
				Aluminum	337	ug/L	3.2E-03	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	9.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.009	
				Chromium VI	0.508	ug/L	8.7E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)⁻¹	4.4E-06	1.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005	
				Iron	605	ug/L	5.7E-03	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	1.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.02	
				Manganese	53.9	ug/L	5.1E-04	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	1.5E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.06	
				Exp. Route Total							2.0E-05					0.8	
				Dermal	cis-1,2-Dichloroethene	4.26	ug/L	5.0E-06	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	1.5E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.007
			Trichloroethene (Mutagenic)	12.2	ug/L	3.5E-05	(mg/kg/day)	9.3E-03	(mg/kg/day)⁻¹	3.3E-07	5.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--		
			Trichloroethene (Nonmutagenic)	12.2	ug/L	1.8E-05	(mg/kg/day)	3.7E-02	(mg/kg/day)⁻¹	7.1E-07	5.6E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.1		
			Vinyl Chloride	1.47	ug/L	7.3E-07	(mg/kg/day)	7.2E-01	(mg/kg/day)⁻¹	5.3E-07	2.1E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0007		
			Aluminum	337	ug/L	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	4.8E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00005		
			Chromium VI	0.508	ug/L	9.1E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)⁻¹	1.8E-06	1.5E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.002		
			Iron	605	ug/L	3.0E-05	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	8.7E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0001		
			Manganese	53.9	ug/L	2.6E-06	(mg/kg/day)	NA	(mg/kg/day)⁻¹	--	7.7E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.008		
			Exp. Route Total							3.4E-06					0.1		
			Exposure Point Total							2.4E-05					1.0		
			Exposure Medium Total							2.4E-05					1.0		
Air	North Waterfront	Inhalation	cis-1,2-Dichloroethene	0.002	mg/m³	7.0E-04	(mg/m³)	NA	(ug/m³)⁻¹	--	2.0E-03	(mg/m³)	NA	(mg/m³)	--		
			Trichloroethene (Mutagenic)	0.006	mg/m³	3.7E-03	(mg/m³)	1.0E-06	(ug/m³)⁻¹	3.7E-06	5.8E-03	(mg/m³)	NA	(mg/m³)	--		
			Trichloroethene (Nonmutagenic)	0.006	mg/m³	2.0E-03	(mg/m³)	3.1E-06	(ug/m³)⁻¹	6.2E-06	5.8E-03	(mg/m³)	2.0E-03	(mg/m³)	2.9		
			Vinyl Chloride	7.4E-4	mg/m³	2.4E-04	(mg/m³)	4.4E-06	(ug/m³)⁻¹	1.1E-06	7.0E-04	(mg/m³)	1.0E-01	(mg/m³)	0.007		
			Aluminum	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-03	(mg/m³)	--		
			Chromium VI	0.0E+0	mg/m³	0.0E+00	(mg/m³)	8.4E-02	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	1.0E-04	(mg/m³)	--		
			Iron	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	NA	(mg/m³)	--		
			Manganese	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-05	(mg/m³)	--		
			Exp. Route Total							1.1E-05					2.9		
		Exposure Point Total							1.1E-05					2.9			
Exposure Medium Total							1.1E-05					2.9					
Medium Total							3.5E-05					3.9					
Total Cancer Risks for Surface Soil and Groundwater											4.4E-05	Total Hazard Indices for Surface Soil and Groundwater					4.0
Total Cancer Risks for Subsurface Soil and Groundwater											4.0E-05	Total Hazard Indices for Subsurface Soil and Groundwater					4.0

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Central Shipyard

LIST OF TABLES
RAGS PART D TABLE 7 - CENTRAL SHIPYARD
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.

Reasonable Maximum Exposures

7.1.RME	Current Adolescent Trespassers - Central Shipyard
7.2.RME	Current Adult Trespassers - Central Shipyard
7.3.RME	Current Industrial Workers - Central Shipyard
7.4.RME	Future Adolescent Trespassers - Central Shipyard
7.5.RME	Future Adult Trespassers - Central Shipyard
7.6.RME	Future Industrial Workers - Central Shipyard
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - Central Shipyard
7.9.RME	Hypothetical Adult Residents - Central Shipyard

TABLE 7.1 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Cecntral Shipyard	Ingestion	Arsenic	24.4	mg/kg	9.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.4E-06	6.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Chromium VI	15.8	mg/kg	1.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	8.9E-07	4.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001	
				Cobalt	14.7	mg/kg	5.5E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Iron	31,800	mg/kg	1.2E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.4E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01	
				Manganese	448	mg/kg	1.7E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005	
			Exp. Route Total								2.3E-06					0.05	
			Dermal	Arsenic	24.4	mg/kg	6.1E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	9.1E-07	4.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Chromium VI	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	14.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	31,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	448	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								9.1E-07					0.01	
		Exposure Point Total								3.2E-06					0.07		
	Exposure Medium Total								3.2E-06					0.07			
	Air	Cecntral Shipyard	Inhalation	Arsenic	2.2E-9	mg/m ³	6.9E-12	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	3.0E-11	4.9E-11	(mg/m ³)	1.5E-05	(mg/m ³)	0.000003	
				Chromium VI	1.4E-9	mg/m ³	1.3E-11	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.1E-09	3.1E-11	(mg/m ³)	1.0E-04	(mg/m ³)	3.1E-7	
				Cobalt	1.3E-9	mg/m ³	4.2E-12	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	3.8E-11	2.9E-11	(mg/m ³)	6.0E-06	(mg/m ³)	0.000005	
				Iron	2.9E-6	mg/m ³	9.1E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.3E-08	(mg/m ³)	NA	(mg/m ³)	--	
				Manganese	4.1E-8	mg/m ³	1.3E-10	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	8.9E-10	(mg/m ³)	5.0E-05	(mg/m ³)	0.00002	
			Exp. Route Total								1.2E-09					0.00003	
		Exposure Point Total								1.2E-09					0.00003		
	Exposure Medium Total								1.2E-09					0.00003			
Medium Total											3.2E-06				0.07		
Total of Receptor Risks Across All Media											3.2E-06	Total of Receptor Hazards Across All Media					0.07

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
 Receptor Population: Trespassers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient		
							Value	Units	Value	Units		Value	Units	Value	Units			
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Arsenic	24.4	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.0E-06	4.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02		
				Chromium VI	15.8	mg/kg	8.5E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	4.2E-07	3.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0010		
				Cobalt	14.7	mg/kg	7.9E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009		
				Iron	31,800	mg/kg	1.7E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.009		
				Manganese	448	mg/kg	2.4E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.4E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.004		
			Exp. Route Total							2.4E-06					0.04			
			Dermal	Arsenic	24.4	mg/kg	1.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.4E-07	5.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002		
				Chromium VI	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--		
				Cobalt	14.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--		
				Iron	31,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--		
				Manganese	448	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--		
			Exp. Route Total								2.4E-07					0.002		
		Exposure Point Total									2.6E-06					0.04		
	Exposure Medium Total										2.6E-06					0.04		
	Air	Central Shipyard	Inhalation	Arsenic	2.2E-9	mg/m³	1.4E-11	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	6.0E-11	4.9E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003		
				Chromium VI	1.4E-9	mg/m³	9.0E-12	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	7.6E-10	3.1E-11	(mg/m³)	1.0E-04	(mg/m³)	3.1E-7		
				Cobalt	1.3E-9	mg/m³	8.4E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	7.5E-11	2.9E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000005		
				Iron	2.9E-8	mg/m³	1.8E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	6.3E-08	(mg/m³)	NA	(mg/m³)	--		
				Manganese	4.1E-8	mg/m³	2.6E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	8.9E-10	(mg/m³)	5.0E-05	(mg/m³)	0.00002		
			Exp. Route Total								8.9E-10					0.00003		
			Exposure Point Total									8.9E-10					0.00003	
		Exposure Medium Total										8.9E-10					0.00003	
	Medium Total										2.6E-06					0.04		
Total of Receptor Risks Across All Media											2.6E-06	Total of Receptor Hazards Across All Media					0.04	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RHC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Arsenic	24.4	mg/kg	8.5E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.3E-05	2.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
				Chromium VI	15.8	mg/kg	5.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	2.8E-06	1.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
				Cobalt	14.7	mg/kg	5.1E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.05
				Iron	31,800	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
				Manganese	448	mg/kg	1.6E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
			Exp. Route Total								1.6E-05					0.2
			Dermal	Arsenic	24.4	mg/kg	1.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.5E-06	4.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Chromium VI	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				Cobalt	14.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Iron	31,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				Manganese	448	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total								2.5E-06					0.02
		Exposure Point Total									1.8E-05					0.2
	Exposure Medium Total										1.8E-05					0.2
	Air	Central Shipyard	Inhalation	Arsenic	2.2E-9	mg/m ³	1.8E-10	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	7.8E-10	5.1E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.00003
				Chromium VI	1.4E-9	mg/m ³	1.2E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	9.8E-09	3.3E-10	(mg/m ³)	1.0E-04	(mg/m ³)	0.00003
				Cobalt	1.3E-9	mg/m ³	1.1E-10	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	9.8E-10	3.1E-10	(mg/m ³)	6.0E-06	(mg/m ³)	0.00005
				Iron	2.9E-6	mg/m ³	2.4E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.6E-07	(mg/m ³)	NA	(mg/m ³)	--
				Manganese	4.1E-6	mg/m ³	3.3E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	9.3E-09	(mg/m ³)	5.0E-05	(mg/m ³)	0.0002
			Exp. Route Total								1.2E-08					0.0003
			Exposure Point Total								1.2E-08					0.0003
		Exposure Medium Total									1.2E-08					0.0003
	Medium Total										1.8E-05					0.2
							Total of Receptor Risks Across All Media				1.8E-05	Total of Receptor Hazards Across All Media				0.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Central Shipyards	Ingestion	Benzo(a)anthracene	0.300	mg/kg	3.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.5E-08	7.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.140	mg/kg	1.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.2E-07	3.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.340	mg/kg	3.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.8E-08	8.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.300	mg/kg	3.4E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	2.5E-10	7.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	8.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.3E-06	6.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Chromium VI	17.3	mg/kg	2.0E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	9.8E-07	4.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002	
				Cobalt	14.6	mg/kg	5.5E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Iron	32,500	mg/kg	1.2E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01	
				Manganese	435	mg/kg	1.6E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.1E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005	
				Exp. Route Total							2.5E-06					0.05	
			Dermal	Benzo(a)anthracene	0.300	mg/kg	9.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.1E-08	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.140	mg/kg	4.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.3E-07	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.340	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.0E-08	2.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.300	mg/kg	9.7E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	7.1E-10	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	5.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	8.8E-07	4.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	32,500	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	435	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
				Exp. Route Total												0.01	
			Exposure Point Total								1.4E-06						0.01
		Exposure Medium Total								3.8E-06						0.07	
Air	Central Shipyards	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m ³	2.6E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.8E-14	6.0E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(a)pyrene	1.3E-11	mg/m ³	1.2E-13	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	1.3E-13	2.8E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(b)fluoranthene	3.1E-11	mg/m ³	2.9E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	3.2E-14	6.8E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Chrysene	2.7E-11	mg/m ³	2.6E-13	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	2.8E-15	6.0E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Arsenic	2.2E-9	mg/m ³	6.7E-12	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	2.9E-11	4.7E-11	(mg/m ³)	1.5E-05	(mg/m ³)	0.000003		
			Chromium VI	1.6E-9	mg/m ³	1.5E-11	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.2E-09	3.4E-11	(mg/m ³)	1.0E-04	(mg/m ³)	3.4E-7		
			Cobalt	1.3E-9	mg/m ³	4.2E-12	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	3.7E-11	2.9E-11	(mg/m ³)	6.0E-06	(mg/m ³)	0.000005		
			Iron	3.0E-6	mg/m ³	9.3E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.5E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Manganese	4.0E-8	mg/m ³	1.2E-10	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	8.7E-10	(mg/m ³)	5.0E-05	(mg/m ³)	0.00002		
			Exp. Route Total							1.3E-09						0.00003	
			Exposure Point Total								1.3E-09						0.00003
			Exposure Medium Total								1.3E-09						0.00003
Medium Total								3.8E-06						0.07			

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.278	mg/kg	3.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.3E-08	7.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.194	mg/kg	2.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.6E-07	5.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.247	mg/kg	2.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.0E-08	6.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.282	mg/kg	3.2E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	2.3E-10	7.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.046	mg/kg	5.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.8E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	2.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.6E-08	5.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	10,200	mg/kg	3.8E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.7E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003	
				Arsenic	18.4	mg/kg	6.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.0E-06	4.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Chromium VI	13.3	mg/kg	1.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	7.5E-07	3.5E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001	
				Cobalt	12.3	mg/kg	4.6E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Iron	26,900	mg/kg	1.0E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01	
			Exp. Route Total							2.0E-06					0.04		
			Dermal	Benzo(a)anthracene	0.278	mg/kg	9.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.5E-08	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.194	mg/kg	6.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.6E-07	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.247	mg/kg	8.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.8E-08	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.282	mg/kg	9.1E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	6.6E-10	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.046	mg/kg	1.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.1E-07	3.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	6.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.7E-08	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	18.4	mg/kg	4.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	6.8E-07	3.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Chromium VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
			Exp. Route Total							1.4E-06					0.01		
		Exposure Point Total								3.5E-06					0.05		
	Exposure Medium Total								3.5E-06					0.05			
Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.5E-11	mg/m³	2.4E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.6E-14	5.5E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	1.8E-11	mg/m³	1.7E-13	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	1.8E-13	3.9E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	2.2E-11	mg/m³	2.1E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.3E-14	4.9E-13	(mg/m³)	NA	(mg/m³)	--		
			Chrysene	2.6E-11	mg/m³	2.4E-13	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	2.6E-15	5.6E-13	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	4.2E-12	mg/m³	3.9E-14	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	4.7E-14	9.2E-14	(mg/m³)	NA	(mg/m³)	--		
			Indeno(1,2,3-cd)pyrene	1.8E-11	mg/m³	1.7E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.9E-14	4.0E-13	(mg/m³)	NA	(mg/m³)	--		
			Aluminum	9.3E-7	mg/m³	2.9E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.0E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000004		
			Arsenic	1.7E-9	mg/m³	5.2E-12	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	2.3E-11	3.7E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000002		
			Chromium VI	1.2E-9	mg/m³	1.1E-11	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	9.5E-10	2.7E-11	(mg/m³)	1.0E-04	(mg/m³)	2.7E-7		
			Cobalt	1.1E-9	mg/m³	3.5E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	3.2E-11	2.5E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000004		
			Iron	2.4E-6	mg/m³	7.7E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	5.4E-08	(mg/m³)	NA	(mg/m³)	--		
		Exp. Route Total							1.0E-09					0.00001			
		Exposure Point Total								1.0E-09					0.00001		
	Exposure Medium Total								1.0E-09					0.00001			
Medium Total								3.5E-06					0.05				
Total of Receptor Risks Across All Media											7.3E-06	Total of Receptor Hazards Across All Media					0.1

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.2E-08	5.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.140	mg/kg	7.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.5E-08	2.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.340	mg/kg	1.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.3E-08	6.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.300	mg/kg	1.6E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.2E-10	5.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.9E-06	4.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Chromium VI	17.3	mg/kg	9.3E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	4.6E-07	3.3E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001	
				Cobalt	14.6	mg/kg	7.8E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009	
				Iron	32,500	mg/kg	1.7E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.009	
				Manganese	435	mg/kg	2.3E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.2E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003	
			Exp. Route Total								2.5E-06					0.04	
			Dermal	Benzo(a)anthracene	0.300	mg/kg	8.4E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.1E-09	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.140	mg/kg	3.9E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.8E-08	1.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.340	mg/kg	9.5E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.9E-09	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.300	mg/kg	8.4E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	6.1E-11	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	1.5E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.3E-07	5.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002	
				Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	32,500	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	435	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								2.7E-07					0.002	
			Exposure Point Total								2.7E-06						0.04
			Exposure Medium Total								2.7E-06						0.04
Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m ³	1.7E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.9E-14	6.0E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(a)pyrene	1.3E-11	mg/m ³	8.0E-14	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	8.8E-14	2.8E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(b)fluoranthene	3.1E-11	mg/m ³	1.9E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.1E-14	6.8E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Chrysene	2.7E-11	mg/m ³	1.7E-13	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	1.9E-15	6.0E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Arsenic	2.2E-9	mg/m ³	1.3E-11	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	5.8E-11	4.7E-11	(mg/m ³)	1.5E-05	(mg/m ³)	0.000003		
			Chromium VI	1.6E-9	mg/m ³	9.8E-12	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	8.3E-10	3.4E-11	(mg/m ³)	1.0E-04	(mg/m ³)	3.4E-7		
			Cobalt	1.3E-9	mg/m ³	8.3E-12	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	7.5E-11	2.9E-11	(mg/m ³)	6.0E-06	(mg/m ³)	0.000005		
			Iron	3.0E-6	mg/m ³	1.9E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.5E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Manganese	4.0E-8	mg/m ³	2.5E-10	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	8.7E-10	(mg/m ³)	5.0E-05	(mg/m ³)	0.00002		
		Exp. Route Total								9.6E-10					0.00003		
		Exposure Point Total								9.6E-10						0.00003	
		Exposure Medium Total								9.6E-10						0.00003	
Medium Total								2.7E-06						0.04			

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.278	mg/kg	1.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	1.1E-08	5.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.194	mg/kg	1.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	7.6E-08	3.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.247	mg/kg	1.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	9.7E-09	4.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.282	mg/kg	1.5E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ¹	1.1E-10	5.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.046	mg/kg	2.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	1.8E-08	8.6E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	1.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	7.8E-09	3.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	10,200	mg/kg	5.5E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	1.9E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002	
				Arsenic	18.4	mg/kg	9.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	1.5E-06	3.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Chromium VI	13.3	mg/kg	7.1E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ¹	3.6E-07	2.5E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0008	
				Cobalt	12.3	mg/kg	6.6E-07	(mg/kg/day)	NA	(mg/kg/day) ¹	--	2.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.008	
				Iron	26,900	mg/kg	1.4E-03	(mg/kg/day)	NA	(mg/kg/day) ¹	--	5.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.007	
			Exp. Route Total								2.0E-06					0.03	
			Dermal	Benzo(a)anthracene	0.278	mg/kg	7.7E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	5.7E-09	2.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.194	mg/kg	5.4E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	3.9E-08	1.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.247	mg/kg	6.9E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	5.0E-09	2.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.282	mg/kg	7.9E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ¹	5.7E-11	2.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.046	mg/kg	1.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	9.3E-09	4.5E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	5.6E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	4.1E-09	1.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	18.4	mg/kg	1.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	1.8E-07	4.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001	
				Chromium VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
			Exp. Route Total								2.4E-07					0.001	
			Exposure Point Total								2.2E-06						0.03
			Exposure Medium Total								2.2E-06						0.03
Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.5E-11	mg/m³	1.6E-13	(mg/m³)	1.1E-04	(ug/m³) ¹	1.7E-14	5.5E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	1.8E-11	mg/m³	1.1E-13	(mg/m³)	1.1E-03	(ug/m³) ¹	1.2E-13	3.9E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	2.2E-11	mg/m³	1.4E-13	(mg/m³)	1.1E-04	(ug/m³) ¹	1.5E-14	4.9E-13	(mg/m³)	NA	(mg/m³)	--		
			Chrysene	2.6E-11	mg/m³	1.6E-13	(mg/m³)	1.1E-05	(ug/m³) ¹	1.8E-15	5.6E-13	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	4.2E-12	mg/m³	2.6E-14	(mg/m³)	1.2E-03	(ug/m³) ¹	3.1E-14	9.2E-14	(mg/m³)	NA	(mg/m³)	--		
			Indeno(1,2,3-cd)pyrene	1.8E-11	mg/m³	1.1E-13	(mg/m³)	1.1E-04	(ug/m³) ¹	1.3E-14	4.0E-13	(mg/m³)	NA	(mg/m³)	--		
			Aluminum	9.3E-7	mg/m³	5.8E-09	(mg/m³)	NA	(ug/m³) ¹	--	2.0E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000004		
			Arsenic	1.7E-9	mg/m³	1.0E-11	(mg/m³)	4.3E-03	(ug/m³) ¹	4.5E-11	3.7E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000002		
			Chromium VI	1.2E-9	mg/m³	7.6E-12	(mg/m³)	8.4E-02	(ug/m³) ¹	6.4E-10	2.7E-11	(mg/m³)	1.0E-04	(mg/m³)	2.7E-7		
			Cobalt	1.1E-9	mg/m³	7.0E-12	(mg/m³)	9.0E-03	(ug/m³) ¹	6.3E-11	2.5E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000004		
			Iron	2.4E-6	mg/m³	1.5E-08	(mg/m³)	NA	(ug/m³) ¹	--	5.4E-08	(mg/m³)	NA	(mg/m³)	--		
			Exp. Route Total								7.4E-10					0.00001	
			Exposure Point Total								7.4E-10						0.00001
			Exposure Medium Total								7.4E-10						0.00001
Medium Total								2.2E-06						0.03			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Central Shipyards	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.7E-08	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.140	mg/kg	4.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.6E-07	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.340	mg/kg	1.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.7E-08	3.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.300	mg/kg	1.0E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	7.7E-10	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	8.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.2E-05	2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08	
				Chromium VI	17.3	mg/kg	6.0E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	3.0E-06	1.7E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0008	
				Cobalt	14.6	mg/kg	5.1E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005	
				Iron	32,500	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.2E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.05	
				Manganese	435	mg/kg	1.5E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02	
				Exp. Route Total							1.6E-05					0.1	
			Dermal	Benzo(a)anthracene	0.300	mg/kg	9.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.6E-08	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.140	mg/kg	4.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.1E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.340	mg/kg	1.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.4E-08	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.300	mg/kg	9.0E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	6.6E-10	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	1.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.5E-06	4.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--	
				Cobalt	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--	
				Iron	32,500	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	435	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
				Exp. Route Total							2.9E-06					0.02	
		Exposure Point Total								1.9E-05					0.2		
	Exposure Medium Total								1.9E-05					0.2			
	Air	Central Shipyards	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m ³	2.2E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.4E-13	6.2E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(a)pyrene	1.3E-11	mg/m ³	1.0E-12	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	1.1E-12	2.9E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(b)fluoranthene	3.1E-11	mg/m ³	2.5E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.8E-13	7.1E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Chrysene	2.7E-11	mg/m ³	2.2E-12	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	2.4E-14	6.2E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Arsenic	2.2E-9	mg/m ³	1.8E-10	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	7.6E-10	4.9E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.00003	
				Chromium VI	1.6E-9	mg/m ³	1.3E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.1E-08	3.6E-10	(mg/m ³)	1.0E-04	(mg/m ³)	0.000004	
				Cobalt	1.3E-9	mg/m ³	1.1E-10	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	9.7E-10	3.0E-10	(mg/m ³)	2.0E-05	(mg/m ³)	0.00002	
				Iron	3.0E-6	mg/m ³	2.4E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.7E-07	(mg/m ³)	NA	(mg/m ³)	--	
				Manganese	4.0E-8	mg/m ³	3.2E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	9.0E-09	(mg/m ³)	5.0E-05	(mg/m ³)	0.0002	
				Exp. Route Total							1.3E-08					0.0002	
				Exposure Point Total								1.3E-08					0.0002
				Exposure Medium Total								1.3E-08					0.0002
Medium Total								1.9E-05					0.2				
Subsurface Soil	Subsurface Soil	Central Shipyards	Ingestion	Benzo(a)anthracene	0.278	mg/kg	9.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.1E-08	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.194	mg/kg	6.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.9E-07	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.247	mg/kg	8.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.3E-08	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.282	mg/kg	9.9E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	7.2E-10	2.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.046	mg/kg	1.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.2E-07	4.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	7.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.1E-08	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	10,200	mg/kg	3.6E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.010	
				Arsenic	18.4	mg/kg	6.4E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	9.6E-06	1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06	
				Chromium VI	13.3	mg/kg	4.6E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	2.3E-06	1.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0007	
				Cobalt	12.3	mg/kg	4.3E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004	
				Iron	26,900	mg/kg	9.4E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.6E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04	
				Exp. Route Total							1.3E-05					0.1	

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	Central Shipyard	Dermal	Benzo(a)anthracene	0.278	mg/kg	8.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.1E-08	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.194	mg/kg	5.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.2E-07	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.247	mg/kg	7.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.4E-08	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.282	mg/kg	8.5E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	6.2E-10	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.046	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.0E-07	3.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	6.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.4E-08	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	18.4	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.9E-06	3.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Chromium VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--	
				Cobalt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--	
				Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
			Exp. Route Total								2.6E-06					0.01	
		Exposure Point Total									1.5E-05					0.1	
	Exposure Medium Total										1.5E-05					0.1	
Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.5E-11	mg/m ³	2.1E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.3E-13	5.8E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(a)pyrene	1.8E-11	mg/m ³	1.4E-12	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	1.6E-12	4.0E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(b)fluoranthene	2.2E-11	mg/m ³	1.8E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.0E-13	5.1E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Chrysene	2.6E-11	mg/m ³	2.1E-12	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	2.3E-14	5.9E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Dibenzo(a,h)anthracene	4.2E-12	mg/m ³	3.4E-13	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	4.1E-13	9.5E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Indeno(1,2,3-cd)pyrene	1.8E-11	mg/m ³	1.5E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.6E-13	4.2E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Aluminum	9.3E-7	mg/m ³	7.6E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.1E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.00004		
			Arsenic	1.7E-9	mg/m ³	1.4E-10	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	5.9E-10	3.8E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.00003		
			Chromium VI	1.2E-9	mg/m ³	9.9E-11	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	8.3E-09	2.8E-10	(mg/m ³)	1.0E-04	(mg/m ³)	0.000003		
			Cobalt	1.1E-9	mg/m ³	9.1E-11	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	8.2E-10	2.6E-10	(mg/m ³)	2.0E-05	(mg/m ³)	0.00001		
			Iron	2.4E-6	mg/m ³	2.0E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	5.6E-07	(mg/m ³)	NA	(mg/m ³)	--		
			Exp. Route Total								9.7E-09					0.00008	
		Exposure Point Total									9.7E-09					0.00008	
	Exposure Medium Total										9.7E-09				0.00008		
Exposure Medium Total										1.5E-05					0.1		
Medium Total											1.5E-05						
Groundwater	Groundwater	Central Shipyard	Ingestion	Aluminum	312	ug/L	1.1E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.1E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003	
				Arsenic	78.1	ug/L	2.7E-04	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	4.1E-04	7.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.5	
				Cadmium	1.5	ug/L	5.3E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.5E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.03	
				Cobalt	24.8	ug/L	8.7E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.4E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.08	
				Iron	65,800	ug/L	2.3E-01	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.4E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.9	
				Manganese	9,100	ug/L	3.2E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.9E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	3.7	
			Exp. Route Total								4.1E-04					7.3	
		Dermal	Aluminum	312	ug/L	4.9E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000001		
			Arsenic	78.1	ug/L	1.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.9E-07	3.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001		
			Cadmium	1.5	ug/L	2.4E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.8E-09	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0003		
			Cobalt	24.8	ug/L	1.6E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.4E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00001		
			Iron	65,800	ug/L	1.0E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.9E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0004		
			Manganese	9,100	ug/L	1.4E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.0E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.04		
	Exp. Route Total								1.9E-07					0.04			
Exposure Point Total									4.1E-04					7.3			
Exposure Medium Total										4.1E-04				7.3			
Exposure Medium Total										4.1E-04				7.3			
Medium Total											4.1E-04				7.3		
Total Cancer Risks for Surface Soil and Subsurface Soil											4.3E-04	Total Hazard Indices for Surface Soil and Subsurface Soil					7.5
Total Cancer Risks for Subsurface Soil and Subsurface Soil											4.2E-04	Total Hazard Indices for Subsurface Soil and Subsurface Soil					7.5

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.300	mg/kg	7.2E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.3E-09	5.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.140	mg/kg	3.4E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.5E-08	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.340	mg/kg	8.2E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.0E-09	5.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.300	mg/kg	7.2E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	5.3E-11	5.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	5.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	8.5E-07	4.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1	
				Chromium VI	17.3	mg/kg	4.1E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	2.1E-07	2.9E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.001	
				Cobalt	14.6	mg/kg	3.5E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.008	
				Iron	32,500	mg/kg	7.8E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.5E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.08	
				Manganese	435	mg/kg	1.0E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03	
			Exp. Route Total							1.1E-06					0.3		
			Dermal	Benzo(a)anthracene	0.300	mg/kg	2.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.0E-09	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.140	mg/kg	1.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	9.6E-09	9.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.340	mg/kg	3.2E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.3E-09	2.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.300	mg/kg	2.8E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	2.0E-11	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	5.1E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	7.7E-08	3.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--	
				Cobalt	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--	
				Iron	32,500	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
		Manganese		435	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--		
		Exp. Route Total							9.1E-08					0.01			
		Exposure Point Total								1.2E-06					0.3		
		Exposure Medium Total								1.2E-06					0.3		
Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.1E-7	mg/m ³	3.6E-10	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	4.0E-11	2.5E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(a)pyrene	1.0E-7	mg/m ³	1.7E-10	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	1.9E-10	1.2E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(b)fluoranthene	2.4E-7	mg/m ³	4.1E-10	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	4.5E-11	2.9E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Chrysene	2.1E-7	mg/m ³	3.6E-10	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	4.0E-12	2.5E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Arsenic	1.7E-5	mg/m ³	2.9E-08	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	1.2E-07	2.0E-06	(mg/m ³)	1.5E-05	(mg/m ³)	0.1		
			Chromium VI	1.2E-5	mg/m ³	2.1E-08	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.8E-06	1.5E-06	(mg/m ³)	1.0E-04	(mg/m ³)	0.01		
			Cobalt	1.0E-5	mg/m ³	1.8E-08	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	1.6E-07	1.2E-06	(mg/m ³)	2.0E-05	(mg/m ³)	0.06		
			Iron	0.023	mg/m ³	3.9E-05	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.8E-03	(mg/m ³)	NA	(mg/m ³)	--		
			Manganese	3.1E-4	mg/m ³	5.3E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	3.7E-05	(mg/m ³)	5.0E-05	(mg/m ³)	0.7		
			Exp. Route Total							2.0E-06					0.9		
		Exposure Point Total								2.0E-06					0.9		
		Exposure Medium Total								2.0E-06					0.9		
Medium Total								3.2E-06					1.2				
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.278	mg/kg	6.7E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.9E-09	4.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.194	mg/kg	4.7E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.4E-08	3.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.247	mg/kg	5.9E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.3E-09	4.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.282	mg/kg	6.8E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	4.9E-11	4.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.046	mg/kg	1.1E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	8.1E-09	7.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	4.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.5E-09	3.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	10,200	mg/kg	2.4E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02	
				Arsenic	18.4	mg/kg	4.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	6.6E-07	3.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1	
				Chromium VI	13.3	mg/kg	3.2E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.6E-07	2.2E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.001	
				Cobalt	12.3	mg/kg	3.0E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.007	
				Iron	26,900	mg/kg	6.5E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.5E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06	
				Exp. Route Total							8.8E-07					0.2	

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	Central Shipyard	Dermal	Benzo(a)anthracene	0.278	mg/kg	2.6E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.9E-09	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.194	mg/kg	1.8E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.3E-08	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.247	mg/kg	2.3E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.7E-09	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.282	mg/kg	2.6E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.9E-11	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.046	mg/kg	4.3E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.1E-09	3.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	1.9E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.4E-09	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	18.4	mg/kg	4.0E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	6.0E-08	2.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009	
				Chromium VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--	
				Cobalt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--	
				Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Exp. Route Total							8.1E-08					0.009	
				Exposure Point Total							9.6E-07					0.2	
				Exposure Medium Total							9.6E-07					0.2	
	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.0E-7	mg/m ³	3.4E-10	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	3.7E-11	2.4E-08	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(a)pyrene	1.4E-7	mg/m ³	2.4E-10	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	2.6E-10	1.6E-08	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(b)fluoranthene	1.8E-7	mg/m ³	3.0E-10	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	3.3E-11	2.1E-08	(mg/m ³)	NA	(mg/m ³)	--	
				Chrysene	2.0E-7	mg/m ³	3.4E-10	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	3.8E-12	2.4E-08	(mg/m ³)	NA	(mg/m ³)	--	
				Dibenzo(a,h)anthracene	3.3E-8	mg/m ³	5.6E-11	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	6.7E-11	3.9E-09	(mg/m ³)	NA	(mg/m ³)	--	
				Indeno(1,2,3-cd)pyrene	1.4E-7	mg/m ³	2.4E-10	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.7E-11	1.7E-08	(mg/m ³)	NA	(mg/m ³)	--	
				Aluminum	0.007	mg/m ³	1.2E-05	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	8.6E-04	(mg/m ³)	5.0E-03	(mg/m ³)	0.2	
				Arsenic	1.3E-5	mg/m ³	2.2E-08	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	9.6E-08	1.6E-06	(mg/m ³)	1.5E-05	(mg/m ³)	0.1	
				Chromium VI	9.5E-6	mg/m ³	1.6E-08	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.4E-06	1.1E-06	(mg/m ³)	1.0E-04	(mg/m ³)	0.01	
				Cobalt	8.8E-6	mg/m ³	1.5E-08	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	1.3E-07	1.0E-06	(mg/m ³)	2.0E-05	(mg/m ³)	0.05	
				Iron	0.019	mg/m ³	3.3E-05	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.3E-03	(mg/m ³)	NA	(mg/m ³)	--	
				Exp. Route Total							1.6E-06					0.3	
				Exposure Point Total							1.6E-06					0.3	
				Exposure Medium Total							1.6E-06					0.3	
				Medium Total							2.5E-06					0.5	
Groundwater	Groundwater	Central Shipyard	Ingestion	Aluminum	312	ug/L	1.1E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.9E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00008	
				Arsenic	78.1	ug/L	2.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	4.3E-07	2.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07	
				Cadmium	1.5	ug/L	5.6E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.9E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0008	
				Cobalt	24.8	ug/L	9.0E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.3E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002	
				Iron	65,800	ug/L	2.4E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.02	
				Manganese	9,100	ug/L	3.3E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.3E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.10	
				Exp. Route Total							4.3E-07					0.2	
			Dermal	Aluminum	312	ug/L	6.0E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.2E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00004	
				Arsenic	78.1	ug/L	1.5E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.2E-07	1.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03	
				Cadmium	1.5	ug/L	2.9E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.1E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.008	
				Cobalt	24.8	ug/L	1.9E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0004	
				Iron	65,800	ug/L	1.3E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.8E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01	
				Manganese	9,100	ug/L	1.7E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-03	(mg/kg/day)	9.6E-04	(mg/kg/day)	1	
				Exp. Route Total							2.2E-07					1.3	
		Exposure Point Total							6.5E-07					1.5			
		Exposure Medium Total							6.5E-07					1.5			
		Medium Total							6.5E-07					1.5			
		Total Cancer Risks for Surface Soil and Subsurface Soil										3.9E-06	Total Hazard Indices for Surface Soil and Subsurface Soil				2.7
		Total Cancer Risks for Subsurface Soil and Subsurface Soil										3.2E-06	Total Hazard Indices for Ssubsurface Soil and Subsurface Soil				2.1

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.8E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.3E-06	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.140	mg/kg	8.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.0E-06	1.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.340	mg/kg	2.0E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.5E-06	4.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.300	mg/kg	1.8E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.3E-08	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	2.6E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.9E-05	3.0E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.0	
				Chromium VI	17.3	mg/kg	1.0E-04	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	5.1E-05	2.2E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.07	
				Cobalt	14.6	mg/kg	1.6E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.9E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.6	
				Iron	32,500	mg/kg	3.6E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.2E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.6	
				Manganese	435	mg/kg	4.8E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.6E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.2	
				Exp. Route Total							9.8E-05					2.5	
			Dermal	Benzo(a)anthracene	0.300	mg/kg	6.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.7E-07	1.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.140	mg/kg	3.0E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.2E-06	6.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.340	mg/kg	7.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.3E-07	1.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.300	mg/kg	6.4E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	4.7E-09	1.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	2.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.3E-06	2.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08	
				Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	32,500	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	435	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
				Exp. Route Total							6.4E-06					0.08	
			Exposure Point Total								1.0E-04					2.6	
		Exposure Medium Total									1.0E-04				2.6		
Air	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	1.2E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.3E-12	2.6E-11	(mg/m³)	NA	(mg/m³)	--	
				Benzo(a)pyrene	1.3E-11	mg/m³	5.6E-12	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	6.1E-12	1.2E-11	(mg/m³)	NA	(mg/m³)	--	
				Benzo(b)fluoranthene	3.1E-11	mg/m³	1.4E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.5E-12	3.0E-11	(mg/m³)	NA	(mg/m³)	--	
				Chrysene	2.7E-11	mg/m³	1.2E-11	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	1.3E-13	2.6E-11	(mg/m³)	NA	(mg/m³)	--	
				Arsenic	2.2E-9	mg/m³	1.8E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	7.6E-10	2.1E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001	
				Chromium VI	1.6E-9	mg/m³	6.9E-10	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	5.8E-08	1.5E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002	
				Cobalt	1.3E-9	mg/m³	1.1E-10	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	9.8E-10	1.3E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0002	
				Iron	3.0E-6	mg/m³	2.4E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.8E-06	(mg/m³)	NA	(mg/m³)	--	
				Manganese	4.0E-8	mg/m³	3.3E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.8E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0008	
				Exp. Route Total							6.0E-08					0.001	
			Exposure Point Total								6.0E-08					0.001	
		Exposure Medium Total									6.0E-08				0.001		
		Medium Total									1.0E-04				2.6		
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.278	mg/kg	1.6E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.2E-06	3.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.194	mg/kg	1.1E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	8.3E-06	2.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.247	mg/kg	1.4E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.1E-06	3.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.282	mg/kg	1.6E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.2E-08	3.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.046	mg/kg	2.7E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.0E-06	5.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	1.2E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.5E-07	2.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	10,200	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.1	
				Arsenic	18.4	mg/kg	2.0E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.0E-05	2.4E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.8	
				Chromium VI	13.3	mg/kg	7.8E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	3.9E-05	1.7E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.06	
				Cobalt	12.3	mg/kg	1.3E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.5	
				Iron	26,900	mg/kg	2.9E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.4E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.5	
				Exp. Route Total							8.2E-05					2.0	

TABLE 7.8 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	Central Shipyard	Dermal	Benzo(a)anthracene	0.278	mg/kg	5.9E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	4.3E-07	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.194	mg/kg	4.1E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	3.0E-06	9.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.247	mg/kg	5.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	3.8E-07	1.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.282	mg/kg	6.0E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ¹	4.4E-09	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.046	mg/kg	9.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	7.1E-07	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	4.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	3.1E-07	9.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	18.4	mg/kg	1.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	2.5E-06	2.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07	
				Chromium VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
			Exp. Route Total								7.4E-06				0.07		
		Exposure Point Total									9.0E-05				2.1		
	Exposure Medium Total										9.0E-05				2.1		
	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.5E-11	mg/m ³	1.1E-11	(mg/m ³)	1.1E-04	(ug/m ³) ¹	1.2E-12	2.4E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(a)pyrene	1.8E-11	mg/m ³	7.7E-12	(mg/m ³)	1.1E-03	(ug/m ³) ¹	8.5E-12	1.7E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(b)fluoranthene	2.2E-11	mg/m ³	9.8E-12	(mg/m ³)	1.1E-04	(ug/m ³) ¹	1.1E-12	2.2E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Chrysene	2.6E-11	mg/m ³	1.1E-11	(mg/m ³)	1.1E-05	(ug/m ³) ¹	1.2E-13	2.5E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Dibenzo(a,h)anthracene	4.2E-12	mg/m ³	1.8E-12	(mg/m ³)	1.2E-03	(ug/m ³) ¹	2.2E-12	4.0E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Indeno(1,2,3-cd)pyrene	1.8E-11	mg/m ³	8.0E-12	(mg/m ³)	1.1E-04	(ug/m ³) ¹	8.8E-13	1.7E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Aluminum	9.3E-7	mg/m ³	7.6E-08	(mg/m ³)	NA	(ug/m ³) ¹	--	8.9E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.0002	
				Arsenic	1.7E-9	mg/m ³	1.4E-10	(mg/m ³)	4.3E-03	(ug/m ³) ¹	5.9E-10	1.6E-09	(mg/m ³)	1.5E-05	(mg/m ³)	0.0001	
				Chromium VI	1.2E-9	mg/m ³	5.3E-10	(mg/m ³)	8.4E-02	(ug/m ³) ¹	4.5E-08	1.2E-09	(mg/m ³)	1.0E-04	(mg/m ³)	0.00001	
				Cobalt	1.1E-9	mg/m ³	9.2E-11	(mg/m ³)	9.0E-03	(ug/m ³) ¹	8.3E-10	1.1E-09	(mg/m ³)	6.0E-06	(mg/m ³)	0.0002	
				Iron	2.4E-6	mg/m ³	2.0E-07	(mg/m ³)	NA	(ug/m ³) ¹	--	2.3E-06	(mg/m ³)	NA	(mg/m ³)	--	
			Exp. Route Total								4.6E-08				0.0005		
		Exposure Point Total									4.6E-08				0.0005		
		Exposure Medium Total										4.6E-08				0.0005	
Medium Total											9.0E-05				2.1		
Groundwater	Groundwater	Central Shipyard	Ingestion	Aluminum	312	ug/L	1.7E-03	(mg/kg/day)	NA	(mg/kg/day) ¹	--	2.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02	
				Arsenic	78.1	ug/L	4.3E-04	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	6.4E-04	5.0E-03	(mg/kg/day)	3.0E-04	(mg/kg/day)	17	
				Cadmium	1.5	ug/L	8.4E-06	(mg/kg/day)	NA	(mg/kg/day) ¹	--	9.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.2	
				Cobalt	24.8	ug/L	1.4E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	1.6E-03	(mg/kg/day)	3.0E-04	(mg/kg/day)	5.3	
				Iron	65,800	ug/L	3.6E-01	(mg/kg/day)	NA	(mg/kg/day) ¹	--	4.2E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	6.0	
				Manganese	9,100	ug/L	5.0E-02	(mg/kg/day)	NA	(mg/kg/day) ¹	--	5.8E-01	(mg/kg/day)	2.4E-02	(mg/kg/day)	24	
			Exp. Route Total								6.4E-04				52		
		Central Shipyard	Dermal	Aluminum	312	ug/L	1.1E-05	(mg/kg/day)	NA	(mg/kg/day) ¹	--	1.3E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0001	
				Arsenic	78.1	ug/L	2.8E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	4.2E-06	3.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1	
				Cadmium	1.5	ug/L	5.5E-08	(mg/kg/day)	NA	(mg/kg/day) ¹	--	6.5E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.03	
				Cobalt	24.8	ug/L	3.6E-07	(mg/kg/day)	NA	(mg/kg/day) ¹	--	4.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Iron	65,800	ug/L	2.4E-03	(mg/kg/day)	NA	(mg/kg/day) ¹	--	2.8E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04	
				Manganese	9,100	ug/L	3.3E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	3.8E-03	(mg/kg/day)	9.6E-04	(mg/kg/day)	4.0	
			Exp. Route Total								4.2E-06				4.2		
		Exposure Point Total									6.5E-04				57		
	Exposure Medium Total										6.5E-04				57		
	Medium Total											6.5E-04				57	
	Total Cancer Risks for Surface Soil and Subsurface Soil											7.5E-04	Total Hazard Indices for Surface Soil and Subsurface Soil				
Total Cancer Risks for Subsurface Soil and Subsurface Soil											7.4E-04	Total Hazard Indices for Subsurface Soil and Subsurface Soil					59

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.300	mg/kg	2.6E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.9E-07	4.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.140	mg/kg	1.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	8.8E-07	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.340	mg/kg	2.9E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.1E-07	4.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	0.300	mg/kg	2.6E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.9E-09	4.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Arsenic	23.7	mg/kg	1.1E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.7E-05	3.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Chromium VI	17.3	mg/kg	1.5E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	7.4E-06	2.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.008
				Cobalt	14.6	mg/kg	6.9E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07
				Iron	32,500	mg/kg	1.5E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.5E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06
				Manganese	435	mg/kg	2.0E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.0E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
				Exp. Route Total							2.5E-05					0.3
			Dermal	Benzo(a)anthracene	0.300	mg/kg	1.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	9.8E-08	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.140	mg/kg	6.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.6E-07	9.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.340	mg/kg	1.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.1E-07	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	0.300	mg/kg	1.3E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	9.8E-10	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Arsenic	23.7	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.0E-06	3.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	17.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				Cobalt	14.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Iron	32,500	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				Manganese	435	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				Exp. Route Total							2.7E-06					0.01
			Exposure Point Total								2.8E-05					0.3
		Exposure Medium Total								2.8E-05					0.3	
	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	1.6E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.8E-12	2.6E-11	(mg/m³)	NA	(mg/m³)	--
				Benzo(a)pyrene	1.3E-11	mg/m³	7.7E-12	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	8.4E-12	1.2E-11	(mg/m³)	NA	(mg/m³)	--
				Benzo(b)fluoranthene	3.1E-11	mg/m³	1.9E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.0E-12	3.0E-11	(mg/m³)	NA	(mg/m³)	--
				Chrysene	2.7E-11	mg/m³	1.6E-11	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	1.8E-13	2.6E-11	(mg/m³)	NA	(mg/m³)	--
				Arsenic	2.2E-9	mg/m³	7.1E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	3.0E-09	2.1E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001
				Chromium VI	1.6E-9	mg/m³	9.5E-10	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	8.0E-08	1.5E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002
				Cobalt	1.3E-9	mg/m³	4.4E-10	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	3.9E-09	1.3E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0002
				Iron	3.0E-6	mg/m³	9.7E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.8E-06	(mg/m³)	NA	(mg/m³)	--
				Manganese	4.0E-8	mg/m³	1.3E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.8E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0008
				Exp. Route Total							8.7E-08					0.001
			Exposure Point Total								8.7E-08					0.001
			Exposure Medium Total								8.7E-08					0.001
		Medium Total								2.8E-05					0.3	
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Benzo(a)anthracene	0.278	mg/kg	2.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.7E-07	3.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.194	mg/kg	1.7E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.2E-06	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.247	mg/kg	2.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.6E-07	3.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	0.282	mg/kg	2.4E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.8E-09	3.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.046	mg/kg	4.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.9E-07	6.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	1.7E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.3E-07	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	10,200	mg/kg	4.8E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
				Arsenic	18.4	mg/kg	8.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.3E-05	2.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
				Chromium VI	13.3	mg/kg	1.1E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	5.7E-06	1.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006
				Cobalt	12.3	mg/kg	5.8E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06
				Iron	26,900	mg/kg	1.3E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.05
				Exp. Route Total							2.1E-05					0.2

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	Central Shipyard	Dermal	Benzo(a)anthracene	0.278	mg/kg	1.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	9.1E-08	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.194	mg/kg	8.7E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.3E-07	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.247	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.1E-08	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.282	mg/kg	1.3E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	9.2E-10	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.046	mg/kg	2.1E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.5E-07	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.200	mg/kg	8.9E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.5E-08	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	18.4	mg/kg	1.0E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.6E-06	3.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Chromium VI	13.3	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	12.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	26,900	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Exp. Route Total								2.6E-06				0.01	
				Exposure Point Total								2.3E-05				0.2	
				Exposure Medium Total								2.3E-05				0.2	
	Air	Central Shipyard	Inhalation	Benzo(a)anthracene	2.5E-11	mg/m ³	1.5E-11	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.7E-12	2.4E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(a)pyrene	1.8E-11	mg/m ³	1.1E-11	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	1.2E-11	1.7E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(b)fluoranthene	2.2E-11	mg/m ³	1.4E-11	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.5E-12	2.2E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Chrysene	2.6E-11	mg/m ³	1.5E-11	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	1.7E-13	2.5E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Dibenzo(a,h)anthracene	4.2E-12	mg/m ³	2.5E-12	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	3.0E-12	4.0E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Indeno(1,2,3-cd)pyrene	1.8E-11	mg/m ³	1.1E-11	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.2E-12	1.7E-11	(mg/m ³)	NA	(mg/m ³)	--	
				Aluminum	9.3E-7	mg/m ³	3.0E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	8.9E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.0002	
				Arsenic	1.7E-9	mg/m ³	5.5E-10	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	2.4E-09	1.6E-09	(mg/m ³)	1.5E-05	(mg/m ³)	0.0001	
				Chromium VI	1.2E-9	mg/m ³	7.3E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	6.1E-08	1.2E-09	(mg/m ³)	1.0E-04	(mg/m ³)	0.00001	
				Cobalt	1.1E-9	mg/m ³	3.7E-10	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	3.3E-09	1.1E-09	(mg/m ³)	6.0E-06	(mg/m ³)	0.0002	
Iron	2.4E-6	mg/m ³	8.0E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.3E-06	(mg/m ³)	NA	(mg/m ³)	--					
Exp. Route Total								6.7E-08				0.0005					
Exposure Point Total								6.7E-08				0.0005					
Exposure Medium Total								6.7E-08				0.0005					
Medium Total									2.3E-05				0.2				
Groundwater	Groundwater	Central Shipyard	Ingestion	Aluminum	312	ug/L	2.9E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.009	
				Arsenic	78.1	ug/L	7.3E-04	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.1E-03	2.1E-03	(mg/kg/day)	3.0E-04	(mg/kg/day)	7.1	
				Cadmium	1.5	ug/L	1.4E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.2E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.08	
				Cobalt	24.8	ug/L	2.3E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.8E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.3	
				Iron	65,800	ug/L	6.2E-01	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.8E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	2.6	
				Manganese	9,100	ug/L	8.5E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.5E-01	(mg/kg/day)	2.4E-02	(mg/kg/day)	10	
				Exp. Route Total							1.1E-03				22		
			Dermal	Aluminum	312	ug/L	1.5E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.5E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00004	
				Arsenic	78.1	ug/L	3.8E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	5.7E-06	1.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04	
				Cadmium	1.5	ug/L	7.5E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.2E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.009	
				Cobalt	24.8	ug/L	4.9E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005	
				Iron	65,800	ug/L	3.2E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.4E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01	
				Manganese	9,100	ug/L	4.5E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-03	(mg/kg/day)	9.6E-04	(mg/kg/day)	1.4	
				Exp. Route Total							5.7E-06				1.4		
	Exposure Point Total								1.1E-03				24				
	Exposure Medium Total								1.1E-03				24				
	Medium Total									1.1E-03				24			
	Total Cancer Risks for Surface Soil and Subsurface Soil											1.1E-03	Total Hazard Indices for Surface Soil and Subsurface Soil				24
	Total Cancer Risks for Subsurface Soil and Subsurface Soil											1.1E-03	Total Hazard Indices for Subsurface Soil and Subsurface Soil				24

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Former Building 234

LIST OF TABLES
RAGS PART D TABLE 7 - FORMER BUILDING 234
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.

Reasonable Maximum Exposures

7.1.RME	Current Adolescent Trespassers - Central Shipyard
7.2.RME	Current Adult Trespassers - Central Shipyard
7.3.RME	Current Industrial Workers - Central Shipyard
7.4.RME	Future Adolescent Trespassers - Central Shipyard
7.5.RME	Future Adult Trespassers - Central Shipyard
7.6.RME	Future Industrial Workers - Central Shipyard
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - Central Shipyard
7.9.RME	Hypothetical Adult Residents - Central Shipyard

TABLE 7.1 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.324	mg/kg	3.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.7E-08	8.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.288	mg/kg	3.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.4E-07	7.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.477	mg/kg	5.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.9E-08	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.409	mg/kg	4.6E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	3.4E-10	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	7.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.1E-08	1.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	2.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.5E-08	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	17.9	mg/kg	6.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.0E-06	4.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Beryllium	3.20	mg/kg	1.2E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.4E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0004	
				Cadmium	13.0	mg/kg	4.9E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.007	
				Chromium VI	83.0	mg/kg	9.4E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	4.7E-06	2.2E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.007	
				Cobalt	20.0	mg/kg	7.5E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Iron	32,100	mg/kg	1.2E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.4E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01	
				Lead	54	mg/kg	2.0E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Manganese	509.0	mg/kg	1.9E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.006	
			Exp. Route Total								6.1E-06					0.07	
			Dermal	Benzo(a)anthracene	0.324	mg/kg	1.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.6E-08	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.288	mg/kg	9.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.8E-07	2.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.477	mg/kg	1.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.1E-07	3.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.409	mg/kg	1.3E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	9.6E-10	3.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	2.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.5E-07	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	5.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.2E-08	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	17.9	mg/kg	4.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	6.7E-07	3.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Beryllium	3.20	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	--	
				Cadmium	13.0	mg/kg	1.1E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.5E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.003	
				Chromium VI	83.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	20.0	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	32,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Lead	54	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--	
				Manganese	509.0	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								1.7E-06					0.01	
			Exposure Point Total									7.8E-06					0.08
			Exposure Medium Total									7.8E-06					0.08
Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.9E-11	mg/m³	2.8E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	3.0E-14	6.5E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	2.6E-11	mg/m³	2.5E-13	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	2.7E-13	5.7E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	4.3E-11	mg/m³	4.1E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	4.5E-14	9.5E-13	(mg/m³)	NA	(mg/m³)	--		
			Chrysene	3.7E-11	mg/m³	3.5E-13	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	3.8E-15	8.1E-13	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	5.6E-12	mg/m³	5.3E-14	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	6.4E-14	1.2E-13	(mg/m³)	NA	(mg/m³)	--		
			Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m³	1.5E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.7E-14	3.6E-13	(mg/m³)	NA	(mg/m³)	--		
			Arsenic	1.6E-9	mg/m³	5.1E-12	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	2.2E-11	3.6E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000002		
			Beryllium	2.9E-10	mg/m³	9.1E-13	(mg/m³)	2.2E-03	(ug/m³) ⁻¹	2.2E-12	6.4E-12	(mg/m³)	2.0E-05	(mg/m³)	3.2E-7		
			Cadmium	1.2E-9	mg/m³	3.7E-12	(mg/m³)	1.8E-03	(ug/m³) ⁻¹	6.7E-12	2.6E-11	(mg/m³)	2.0E-05	(mg/m³)	0.000001		
			Chromium VI	7.5E-9	mg/m³	7.1E-11	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	6.0E-09	1.7E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000002		
			Cobalt	1.8E-9	mg/m³	5.7E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	5.1E-11	4.0E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000007		
			Iron	2.9E-6	mg/m³	9.1E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	6.4E-08	(mg/m³)	NA	(mg/m³)	--		
			Lead	4.9E-9	mg/m³	1.5E-11	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.1E-10	(mg/m³)	NA	(mg/m³)	--		
			Manganese	4.6E-8	mg/m³	1.4E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.0E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00002		
			Exp. Route Total								6.0E-09					0.00003	
			Exposure Point Total									6.0E-09					0.00003
			Exposure Medium Total									6.0E-09					0.00003
			Medium Total									7.8E-06					0.08
Total of Receptor Risks Across All Media										7.8E-06	Total of Receptor Hazards Across All Media					0.08	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.324	mg/kg	1.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.3E-08	6.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.288	mg/kg	1.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.1E-07	5.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.477	mg/kg	2.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.9E-08	9.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.409	mg/kg	2.2E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.6E-10	7.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	3.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.4E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	9.7E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.1E-09	3.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	17.9	mg/kg	9.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.4E-06	3.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Beryllium	3.20	mg/kg	1.7E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.0E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0003	
				Cadmium	13.0	mg/kg	7.0E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.005	
				Chromium VI	83.0	mg/kg	4.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	2.2E-06	1.6E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005	
				Cobalt	20.0	mg/kg	1.1E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Iron	32,100	mg/kg	1.7E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.009	
				Lead	54	mg/kg	2.9E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Manganese	509.0	mg/kg	2.7E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.6E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.004	
			Exp. Route Total								3.8E-06					0.05	
			Dermal	Benzo(a)anthracene	0.324	mg/kg	9.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.6E-09	3.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.288	mg/kg	8.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.9E-08	2.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.477	mg/kg	1.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	9.7E-09	4.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.409	mg/kg	1.1E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	8.3E-11	4.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	1.7E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.3E-08	6.0E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	5.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.7E-09	1.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	17.9	mg/kg	1.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.7E-07	4.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001	
				Beryllium	3.20	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	--	
				Cadmium	13.0	mg/kg	2.8E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.7E-09	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0004	
				Chromium VI	83.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	20.0	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	32,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Lead	54	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--	
				Manganese	509.0	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								2.6E-07					0.002	
			Exposure Point Total									4.1E-06					0.05
			Exposure Medium Total									4.1E-06					0.05
Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.9E-11	mg/m³	1.8E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.0E-14	6.5E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	2.6E-11	mg/m³	1.6E-13	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	1.8E-13	5.7E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	4.3E-11	mg/m³	2.7E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	3.0E-14	9.5E-13	(mg/m³)	NA	(mg/m³)	--		
			Chrysene	3.7E-11	mg/m³	2.3E-13	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	2.6E-15	8.1E-13	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	5.6E-12	mg/m³	3.5E-14	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	4.2E-14	1.2E-13	(mg/m³)	NA	(mg/m³)	--		
			Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m³	1.0E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.1E-14	3.6E-13	(mg/m³)	NA	(mg/m³)	--		
			Arsenic	1.6E-9	mg/m³	1.0E-11	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	4.4E-11	3.6E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000002		
			Beryllium	2.9E-10	mg/m³	1.8E-12	(mg/m³)	2.4E-03	(ug/m³) ⁻¹	4.4E-12	6.4E-12	(mg/m³)	2.0E-05	(mg/m³)	3.2E-7		
			Cadmium	1.2E-9	mg/m³	7.4E-12	(mg/m³)	1.8E-03	(ug/m³) ⁻¹	1.3E-11	2.6E-11	(mg/m³)	2.0E-05	(mg/m³)	0.000001		
			Chromium VI	7.5E-9	mg/m³	4.7E-11	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	4.0E-09	1.7E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000002		
			Cobalt	1.8E-9	mg/m³	1.1E-11	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	1.0E-10	4.0E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000007		
			Iron	2.9E-6	mg/m³	1.8E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	6.4E-08	(mg/m³)	NA	(mg/m³)	--		
			Lead	4.6E-8	mg/m³	2.9E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.0E-09	(mg/m³)	NA	(mg/m³)	--		
			Manganese	4.6E-8	mg/m³	2.9E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.0E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00002		
			Exp. Route Total								4.1E-09					0.00003	
			Exposure Point Total									4.1E-09					0.00003
			Exposure Medium Total									4.1E-09					0.00003
			Medium Total									4.1E-06					0.05
Total of Receptor Risks Across All Media											4.1E-06	Total of Receptor Hazards Across All Media					0.05

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.324	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	8.3E-08	3.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.288	mg/kg	1.0E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	7.3E-07	2.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.477	mg/kg	1.7E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	1.2E-07	4.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.409	mg/kg	1.4E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ¹	1.0E-09	4.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	2.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	1.6E-07	6.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	6.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	4.6E-08	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	17.9	mg/kg	6.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	9.4E-06	1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06	
				Beryllium	3.20	mg/kg	1.1E-06	(mg/kg/day)	NA	(mg/kg/day) ¹	--	3.1E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.002	
				Cadmium	13.0	mg/kg	4.5E-06	(mg/kg/day)	NA	(mg/kg/day) ¹	--	1.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.03	
				Chromium VI	83.0	mg/kg	2.9E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ¹	1.5E-05	8.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.03	
				Cobalt	20.0	mg/kg	7.0E-06	(mg/kg/day)	NA	(mg/kg/day) ¹	--	2.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07	
				Iron	32,100	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day) ¹	--	3.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04	
				Lead	54	mg/kg	1.9E-05	(mg/kg/day)	NA	(mg/kg/day) ¹	--	5.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Manganese	509.0	mg/kg	1.8E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	5.0E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02	
			Exp. Route Total								2.5E-05					0.2	
			Dermal	Benzo(a)anthracene	0.324	mg/kg	9.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	7.1E-08	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.288	mg/kg	8.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	6.3E-07	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.477	mg/kg	1.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	1.0E-07	4.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.409	mg/kg	1.2E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ¹	9.0E-10	3.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	1.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	1.4E-07	5.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	5.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	3.9E-08	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	17.9	mg/kg	1.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	1.9E-06	3.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Beryllium	3.20	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	--	
				Cadmium	13.0	mg/kg	3.0E-08	(mg/kg/day)	NA	(mg/kg/day) ¹	--	8.4E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.003	
				Chromium VI	83.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	20.0	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	32,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Lead	54	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--	
				Manganese	509.0	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								2.8E-06					0.01	
			Exposure Point Total								2.8E-05					0.3	
			Exposure Medium Total								2.8E-05					0.3	
Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.9E-11	mg/m ³	2.4E-12	(mg/m ³)	1.1E-04	(ug/m ³) ¹	2.6E-13	6.7E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(a)pyrene	2.6E-11	mg/m ³	2.1E-12	(mg/m ³)	1.1E-03	(ug/m ³) ¹	2.3E-12	6.0E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(b)fluoranthene	4.3E-11	mg/m ³	3.5E-12	(mg/m ³)	1.1E-04	(ug/m ³) ¹	3.9E-13	9.9E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Chrysene	3.7E-11	mg/m ³	3.0E-12	(mg/m ³)	1.1E-05	(ug/m ³) ¹	3.3E-14	8.5E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Dibenzo(a,h)anthracene	5.6E-12	mg/m ³	4.6E-13	(mg/m ³)	1.2E-03	(ug/m ³) ¹	5.5E-13	1.3E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m ³	1.3E-12	(mg/m ³)	1.1E-04	(ug/m ³) ¹	1.5E-13	3.7E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Arsenic	1.6E-9	mg/m ³	1.3E-10	(mg/m ³)	4.3E-03	(ug/m ³) ¹	5.7E-10	3.7E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.00002		
			Beryllium	2.9E-10	mg/m ³	2.4E-11	(mg/m ³)	2.4E-03	(ug/m ³) ¹	5.7E-11	6.6E-11	(mg/m ³)	2.0E-05	(mg/m ³)	0.00003		
			Cadmium	1.2E-9	mg/m ³	9.6E-11	(mg/m ³)	1.8E-03	(ug/m ³) ¹	1.7E-10	2.7E-10	(mg/m ³)	2.0E-05	(mg/m ³)	0.00001		
			Chromium VI	7.5E-9	mg/m ³	6.2E-10	(mg/m ³)	8.4E-02	(ug/m ³) ¹	5.2E-08	1.7E-09	(mg/m ³)	1.0E-04	(mg/m ³)	0.00002		
			Cobalt	1.8E-9	mg/m ³	1.5E-10	(mg/m ³)	9.0E-03	(ug/m ³) ¹	1.3E-09	4.2E-10	(mg/m ³)	6.0E-06	(mg/m ³)	0.00007		
			Iron	2.9E-6	mg/m ³	2.4E-07	(mg/m ³)	NA	(ug/m ³) ¹	--	6.7E-07	(mg/m ³)	NA	(mg/m ³)	--		
			Lead	4.9E-9	mg/m ³	4.0E-10	(mg/m ³)	NA	(ug/m ³) ¹	--	1.1E-09	(mg/m ³)	NA	(mg/m ³)	--		
			Manganese	4.6E-8	mg/m ³	3.6E-09	(mg/m ³)	NA	(ug/m ³) ¹	--	1.1E-08	(mg/m ³)	5.0E-05	(mg/m ³)	0.0002		
		Exp. Route Total								5.4E-08					0.0003		
		Exposure Point Total								5.4E-08					0.0003		
		Exposure Medium Total								5.4E-08					0.0003		
		Medium Total								2.8E-05					0.3		
		Total of Receptor Risks Across All Media											2.8E-05	Total of Receptor Hazards Across All Media			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.300	mg/kg	3.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.5E-08	7.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.270	mg/kg	3.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.2E-07	7.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.430	mg/kg	4.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.5E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.360	mg/kg	4.1E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	3.0E-10	9.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	7.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.1E-08	1.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	2.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.5E-08	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	16.4	mg/kg	6.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	9.2E-07	4.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Beryllium	3.50	mg/kg	1.3E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.2E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0005	
				Cadmium	13.0	mg/kg	4.9E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.007	
				Chromium VI	91.1	mg/kg	1.0E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	5.1E-06	2.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.008	
				Cobalt	17.8	mg/kg	6.7E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Iron	30,020	mg/kg	1.1E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01	
				Lead	53.6	mg/kg	2.0E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Manganese	474	mg/kg	1.8E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005	
		Exp. Route Total								6.4E-06					0.06		
		Dermal	Benzo(a)anthracene	0.300	mg/kg	9.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.1E-08	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Benzo(a)pyrene	0.270	mg/kg	8.7E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.4E-07	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Benzo(b)fluoranthene	0.430	mg/kg	1.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.0E-07	3.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Chrysene	0.360	mg/kg	1.2E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	8.5E-10	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Dibenzo(a,h)anthracene	0.062	mg/kg	2.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.5E-07	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--		
			Indeno(1,2,3-cd)pyrene	0.180	mg/kg	5.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.2E-08	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Arsenic	16.4	mg/kg	4.1E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	6.1E-07	2.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009		
			Beryllium	3.50	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	--		
			Cadmium	13.0	mg/kg	1.1E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.5E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.003		
			Chromium VI	91.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--		
			Cobalt	17.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--		
			Iron	30,020	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--		
			Lead	53.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--		
			Manganese	474	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--		
		Exp. Route Total								1.6E-06					0.01		
		Exposure Point Total								8.0E-06						0.07	
		Exposure Medium Total								8.0E-06						0.07	
Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	2.6E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.8E-14	6.0E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	2.5E-11	mg/m³	2.3E-13	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	2.5E-13	5.4E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	3.9E-11	mg/m³	3.7E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	4.0E-14	8.6E-13	(mg/m³)	NA	(mg/m³)	--		
			Chrysene	3.3E-11	mg/m³	3.1E-13	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	3.4E-15	7.2E-13	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	5.6E-12	mg/m³	5.3E-14	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	6.4E-14	1.2E-13	(mg/m³)	NA	(mg/m³)	--		
			Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m³	1.5E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.7E-14	3.6E-13	(mg/m³)	NA	(mg/m³)	--		
			Arsenic	1.5E-9	mg/m³	4.7E-12	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	2.0E-11	3.3E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000002		
			Beryllium	3.2E-10	mg/m³	1.0E-12	(mg/m³)	2.4E-03	(ug/m³) ⁻¹	2.4E-12	7.0E-12	(mg/m³)	2.0E-05	(mg/m³)	3.5E-7		
			Cadmium	1.2E-9	mg/m³	3.7E-12	(mg/m³)	1.8E-03	(ug/m³) ⁻¹	6.7E-12	2.6E-11	(mg/m³)	2.0E-05	(mg/m³)	0.000001		
			Chromium VI	8.3E-9	mg/m³	7.8E-11	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	6.5E-09	1.8E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000002		
			Cobalt	1.6E-9	mg/m³	5.1E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	4.6E-11	3.5E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000006		
			Iron	2.7E-6	mg/m³	8.5E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	8.0E-08	(mg/m³)	NA	(mg/m³)	--		
			Lead	4.9E-9	mg/m³	1.5E-11	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.1E-10	(mg/m³)	NA	(mg/m³)	--		
			Manganese	4.3E-8	mg/m³	1.3E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	9.4E-10	(mg/m³)	5.0E-05	(mg/m³)	0.00002		
			Exp. Route Total								6.6E-09					0.00003	
			Exposure Point Total								6.6E-09						0.00003
			Exposure Medium Total								6.6E-09						0.00003
Medium Total											8.0E-06				0.07		

TABLE 7.4 RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
 Receptor Population: Trespasser
 Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations						
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient		
							Value	Units	Value	Units		Value	Units	Value	Units			
Subsurface Soil	Subsurface Soil	Former Building 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	6.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.5E-08	1.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--		
				Aluminum	12,600	mg/kg	4.7E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003		
				Arsenic	23.3	mg/kg	8.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.3E-06	6.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02		
				Chromium VI	25.4	mg/kg	2.9E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.4E-06	6.7E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002		
				Cobalt	13.3	mg/kg	5.0E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01		
				Iron	31,600	mg/kg	1.2E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.3E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01		
				Manganese	684	mg/kg	2.6E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.8E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.007		
			Exp. Route Total								2.8E-06					0.06		
			Dermal	Benzo(a)pyrene	0.055	mg/kg	1.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.3E-07	4.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--		
				Aluminum	12,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--		
				Arsenic	23.3	mg/kg	5.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	8.7E-07	4.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01		
				Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--		
				Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--		
				Iron	31,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--		
				Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--		
			Exp. Route Total								1.0E-06					0.01		
		Exposure Point Total									3.8E-06					0.07		
		Exposure Medium Total										3.8E-06					0.07	
		Air	Former Building 234	Inhalation	Benzo(a)pyrene	5.0E-12	mg/m³	4.7E-14	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	5.2E-14	1.1E-13	(mg/m³)	NA	(mg/m³)	--	
					Aluminum	1.1E-6	mg/m³	3.6E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.5E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000005	
					Arsenic	2.1E-9	mg/m³	6.6E-12	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	2.9E-11	4.6E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003	
					Chromium VI	2.3E-9	mg/m³	2.2E-11	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	1.8E-09	5.1E-11	(mg/m³)	1.0E-04	(mg/m³)	5.1E-7	
					Cobalt	1.2E-9	mg/m³	3.8E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	3.4E-11	2.7E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000004	
					Iron	2.9E-6	mg/m³	9.0E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	6.3E-08	(mg/m³)	NA	(mg/m³)	--	
					Manganese	6.2E-8	mg/m³	1.9E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.4E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00003	
				Exp. Route Total								1.9E-09					0.00004	
				Exposure Point Total									1.9E-09					0.00004
				Exposure Medium Total										1.9E-09				0.00004
Medium Total													3.8E-06				0.07	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.2E-08	5.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.270	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.1E-07	5.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.430	mg/kg	2.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.7E-08	8.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	0.360	mg/kg	1.9E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.4E-10	6.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.062	mg/kg	3.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.4E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	9.7E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.1E-09	3.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Arsenic	16.4	mg/kg	8.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.3E-06	3.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Beryllium	3.50	mg/kg	1.9E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.6E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0003
				Cadmium	13.0	mg/kg	7.0E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.005
				Chromium VI	91.1	mg/kg	4.9E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	2.4E-06	1.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006
				Cobalt	17.8	mg/kg	9.6E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Iron	30,020	mg/kg	1.6E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.6E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.008
				Lead	53.6	mg/kg	2.9E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	474	mg/kg	2.5E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.9E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.004
				Exp. Route Total							3.9E-06					0.04
			Dermal	Benzo(a)anthracene	0.300	mg/kg	8.4E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.1E-09	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.270	mg/kg	7.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.5E-08	2.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.430	mg/kg	1.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.7E-09	4.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	0.360	mg/kg	1.0E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	7.3E-11	3.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.062	mg/kg	1.7E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.3E-08	6.0E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	5.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.7E-09	1.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Arsenic	16.4	mg/kg	1.1E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.6E-07	3.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001
				Beryllium	3.50	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	--
				Cadmium	13.0	mg/kg	2.8E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.7E-09	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0004
				Chromium VI	91.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				Cobalt	17.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Iron	30,020	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				Lead	53.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	474	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				Exp. Route Total							2.4E-07					0.002
			Exposure Point Total								4.2E-06					0.05
		Exposure Medium Total									4.2E-06				0.05	
Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m ³	1.7E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.9E-14	6.0E-13	(mg/m ³)	NA	(mg/m ³)	--	
			Benzo(a)pyrene	2.5E-11	mg/m ³	1.5E-13	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	1.7E-13	5.4E-13	(mg/m ³)	NA	(mg/m ³)	--	
			Benzo(b)fluoranthene	3.9E-11	mg/m ³	2.4E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.7E-14	8.6E-13	(mg/m ³)	NA	(mg/m ³)	--	
			Chrysene	3.3E-11	mg/m ³	2.0E-13	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	2.3E-15	7.2E-13	(mg/m ³)	NA	(mg/m ³)	--	
			Dibenzo(a,h)anthracene	5.6E-12	mg/m ³	3.5E-14	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	4.2E-14	1.2E-13	(mg/m ³)	NA	(mg/m ³)	--	
			Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m ³	1.0E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.1E-14	3.6E-13	(mg/m ³)	NA	(mg/m ³)	--	
			Arsenic	1.5E-9	mg/m ³	9.3E-12	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	4.0E-11	3.3E-11	(mg/m ³)	1.5E-05	(mg/m ³)	0.000002	
			Beryllium	3.2E-10	mg/m ³	2.0E-12	(mg/m ³)	2.4E-03	(ug/m ³) ⁻¹	4.8E-12	7.0E-12	(mg/m ³)	2.0E-05	(mg/m ³)	3.5E-7	
			Cadmium	1.2E-9	mg/m ³	7.4E-12	(mg/m ³)	1.6E-03	(ug/m ³) ⁻¹	1.3E-11	2.6E-11	(mg/m ³)	2.0E-05	(mg/m ³)	0.000001	
			Chromium VI	8.3E-9	mg/m ³	5.2E-11	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	4.4E-09	1.8E-10	(mg/m ³)	1.0E-04	(mg/m ³)	0.000002	
			Cobalt	1.6E-9	mg/m ³	1.0E-11	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	9.1E-11	3.5E-11	(mg/m ³)	6.0E-06	(mg/m ³)	0.000006	
			Iron	2.7E-6	mg/m ³	1.7E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.0E-08	(mg/m ³)	NA	(mg/m ³)	--	
			Lead	4.9E-9	mg/m ³	3.1E-11	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.1E-10	(mg/m ³)	NA	(mg/m ³)	--	
			Manganese	4.3E-8	mg/m ³	2.7E-10	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	9.4E-10	(mg/m ³)	5.0E-05	(mg/m ³)	0.00002	
			Exp. Route Total							4.5E-09					0.00003	
		Exposure Point Total								4.5E-09					0.00003	
		Exposure Medium Total									4.5E-09				0.00003	
	Medium Total										4.2E-06				0.05	

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Former Building 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	3.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.2E-08	1.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	12.600	mg/kg	6.8E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.4E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
				Arsenic	23.3	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.9E-06	4.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	25.4	mg/kg	1.4E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	6.8E-07	4.8E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
				Cobalt	13.3	mg/kg	7.1E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.008
				Iron	31.600	mg/kg	1.7E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.008
				Manganese	684	mg/kg	3.7E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005
			Exp. Route Total								2.6E-06					0.04
			Dermal	Benzo(a)pyrene	0.055	mg/kg	1.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.1E-08	5.4E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	12.600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				Arsenic	23.3	mg/kg	1.5E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.2E-07	5.2E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
				Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Iron	31.600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total								2.4E-07					0.002
		Exposure Point Total									2.8E-06					0.04
	Exposure Medium Total										2.8E-06					0.04
	Air	Former Building 234	Inhalation	Benzo(a)pyrene	5.0E-12	mg/m ³	3.1E-14	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	3.4E-14	1.1E-13	(mg/m ³)	NA	(mg/m ³)	--
				Aluminum	1.1E-6	mg/m ³	7.2E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.5E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000005
				Arsenic	2.1E-9	mg/m ³	1.3E-11	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	5.7E-11	4.6E-11	(mg/m ³)	1.5E-05	(mg/m ³)	0.000003
				Chromium VI	2.3E-9	mg/m ³	1.4E-11	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.2E-09	5.1E-11	(mg/m ³)	1.0E-04	(mg/m ³)	5.1E-7
				Cobalt	1.2E-9	mg/m ³	7.6E-12	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	6.8E-11	2.7E-11	(mg/m ³)	6.0E-06	(mg/m ³)	0.000004
				Iron	2.9E-6	mg/m ³	1.8E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.3E-08	(mg/m ³)	NA	(mg/m ³)	--
				Manganese	6.2E-8	mg/m ³	3.9E-10	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.4E-09	(mg/m ³)	5.0E-05	(mg/m ³)	0.00003
			Exp. Route Total								1.3E-09					0.00004
		Exposure Point Total									1.3E-09					0.00004
	Exposure Medium Total										1.3E-09					0.00004
	Medium Total										2.8E-06					0.04

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.7E-08	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.270	mg/kg	9.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.9E-07	2.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.430	mg/kg	1.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.1E-07	4.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.360	mg/kg	1.3E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	9.2E-10	3.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	2.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.6E-07	6.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	6.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.6E-08	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	16.4	mg/kg	5.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	8.6E-06	1.6E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.05	
				Beryllium	3.50	mg/kg	1.2E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.4E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.002	
				Cadmium	13.0	mg/kg	4.5E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.03	
				Chromium VI	91.1	mg/kg	3.2E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.6E-05	8.9E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.03	
				Cobalt	17.8	mg/kg	6.2E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06	
				Iron	30,020	mg/kg	1.0E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.9E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04	
				Lead	53.6	mg/kg	1.9E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Manganese	474	mg/kg	1.7E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.6E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02	
		Exp. Route Total								2.6E-05					0.2		
		Dermal	Benzo(a)anthracene	0.300	mg/kg	9.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.6E-08	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Benzo(a)pyrene	0.270	mg/kg	8.1E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.9E-07	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Benzo(b)fluoranthene	0.430	mg/kg	1.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	9.4E-08	3.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Chrysene	0.360	mg/kg	1.1E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	7.9E-10	3.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Dibenzo(a,h)anthracene	0.062	mg/kg	1.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.4E-07	5.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--		
			Indeno(1,2,3-cd)pyrene	0.180	mg/kg	5.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.9E-08	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Arsenic	16.4	mg/kg	1.1E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.7E-06	3.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01		
			Beryllium	3.50	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	--		
			Cadmium	13.0	mg/kg	3.0E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.4E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.003		
			Chromium VI	91.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--		
			Cobalt	17.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--		
			Iron	30,020	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--		
			Lead	53.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--		
			Manganese	474	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--		
		Exp. Route Total								2.6E-06					0.01		
		Exposure Point Total									2.8E-05					0.2	
		Exposure Medium Total									2.8E-05					0.2	
Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	2.2E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.4E-13	6.2E-12	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	2.5E-11	mg/m³	2.0E-12	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	2.2E-12	5.6E-12	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	3.9E-11	mg/m³	3.2E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	3.5E-13	8.9E-12	(mg/m³)	NA	(mg/m³)	--		
			Chrysene	3.3E-11	mg/m³	2.7E-12	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	2.9E-14	7.5E-12	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	5.6E-12	mg/m³	4.6E-13	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	5.5E-13	1.3E-12	(mg/m³)	NA	(mg/m³)	--		
			Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m³	1.3E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.5E-13	3.7E-12	(mg/m³)	NA	(mg/m³)	--		
			Arsenic	1.5E-9	mg/m³	1.2E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	5.2E-10	3.4E-10	(mg/m³)	1.5E-05	(mg/m³)	0.00002		
			Beryllium	3.2E-10	mg/m³	2.6E-11	(mg/m³)	2.4E-03	(ug/m³) ⁻¹	6.2E-11	7.3E-11	(mg/m³)	2.0E-05	(mg/m³)	0.000004		
			Cadmium	1.2E-9	mg/m³	9.6E-11	(mg/m³)	1.8E-03	(ug/m³) ⁻¹	1.7E-10	2.7E-10	(mg/m³)	2.0E-05	(mg/m³)	0.00001		
			Chromium VI	8.3E-9	mg/m³	6.8E-10	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	5.7E-08	1.9E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002		
			Cobalt	1.6E-9	mg/m³	1.3E-10	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	1.2E-09	3.7E-10	(mg/m³)	6.0E-06	(mg/m³)	0.00006		
			Iron	2.7E-6	mg/m³	2.2E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	6.2E-07	(mg/m³)	NA	(mg/m³)	--		
			Lead	4.9E-9	mg/m³	4.0E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.1E-09	(mg/m³)	NA	(mg/m³)	--		
			Manganese	4.3E-8	mg/m³	3.5E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	9.8E-09	(mg/m³)	5.0E-05	(mg/m³)	0.0002		
		Exp. Route Total								5.9E-08					0.0003		
		Exposure Point Total									5.9E-08					0.0003	
		Exposure Medium Total									5.9E-08					0.0003	
		Medium Total									2.8E-05					0.2	

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations						
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient		
							Value	Units	Value	Units		Value	Units	Value	Units			
Subsurface Soil	Subsurface Soil	Former Building 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	1.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.4E-07	5.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--		
				Aluminum	12,600	mg/kg	4.4E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01		
				Arsenic	23.3	mg/kg	8.1E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.2E-05	2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08		
				Chromium VI	25.4	mg/kg	8.9E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	4.4E-06	2.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.008		
				Cobalt	13.3	mg/kg	4.6E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04		
				Iron	31,600	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04		
				Manganese	684	mg/kg	2.4E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.7E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03		
				Exp. Route Total							1.7E-05					0.2		
			Dermal	Benzo(a)pyrene	0.055	mg/kg	1.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.2E-07	4.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--		
				Aluminum	12,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--		
				Arsenic	23.3	mg/kg	1.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.4E-06	4.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02		
				Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--		
				Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--		
				Iron	31,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--		
				Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--		
				Exp. Route Total							2.5E-06					0.02		
			Exposure Point Total								1.9E-05					0.2		
		Exposure Medium Total								1.9E-05					0.2			
		Air	Former Building 234	Inhalation	Benzo(a)pyrene	5.0E-12	mg/m ³	4.1E-13	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	4.5E-13	1.1E-12	(mg/m ³)	NA	(mg/m ³)	--	
					Aluminum	1.1E-6	mg/m ³	9.3E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.6E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.00005	
					Arsenic	2.1E-9	mg/m ³	1.7E-10	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	7.4E-10	4.8E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.00003	
					Chromium VI	2.3E-9	mg/m ³	1.9E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.6E-08	5.3E-10	(mg/m ³)	1.0E-04	(mg/m ³)	0.000005	
					Cobalt	1.2E-9	mg/m ³	9.9E-11	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	8.9E-10	2.8E-10	(mg/m ³)	6.0E-06	(mg/m ³)	0.00005	
					Iron	2.9E-6	mg/m ³	2.3E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.6E-07	(mg/m ³)	NA	(mg/m ³)	--	
					Manganese	6.2E-8	mg/m ³	5.1E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.4E-08	(mg/m ³)	5.0E-05	(mg/m ³)	0.0003	
Exp. Route Total										1.7E-08					0.0004			
Exposure Point Total											1.7E-08					0.0004		
Exposure Medium Total										1.7E-08					0.0004			
Medium Total										1.9E-05					0.2			
Groundwater	Groundwater	Former Building 234	Ingestion	cis-1,2-Dichloroethene	12.7	ug/L	4.4E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.06		
				Trichloroethene	3.90	ug/L	1.4E-05	(mg/kg/day)	4.6E-02	(mg/kg/day) ⁻¹	6.3E-07	3.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.08		
				Vinyl Chloride	0.263	ug/L	9.2E-07	(mg/kg/day)	7.2E-01	(mg/kg/day) ⁻¹	6.6E-07	2.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0009		
				Aluminum	53.7	ug/L	1.9E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.3E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0005		
				Arsenic	1.32	ug/L	4.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	6.9E-06	1.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04		
				Cobalt	1.74	ug/L	6.1E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06		
				Iron	459	ug/L	1.6E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.006		
				Manganese	532	ug/L	1.9E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.2E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.2		
			Exp. Route Total							8.2E-06					0.5			
			Dermal	cis-1,2-Dichloroethene	12.7	ug/L	5.2E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0007		
				Trichloroethene	3.90	ug/L	2.1E-07	(mg/kg/day)	4.6E-02	(mg/kg/day) ⁻¹	9.8E-09	6.0E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.001		
				Vinyl Chloride	0.263	ug/L	4.4E-09	(mg/kg/day)	7.2E-01	(mg/kg/day) ⁻¹	3.2E-09	1.2E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.000004		
				Aluminum	53.7	ug/L	8.5E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.4E-07	(mg/kg/day)	1.0E+00	(mg/kg/day)	2.4E-7		
				Arsenic	1.32	ug/L	2.1E-09	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.1E-09	5.8E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00002		
				Cobalt	1.74	ug/L	1.1E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.1E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00001		
				Iron	459	ug/L	7.3E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.0E-06	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.000003		
				Manganese	532	ug/L	8.4E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.4E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.002		
		Exp. Route Total								1.6E-08					0.004			
		Exposure Point Total								8.2E-06					0.5			
		Exposure Medium Total								8.2E-06					0.5			
		Medium Total								8.2E-06					0.5			
		Total Cancer Risk for Surface Soil and Groundwater										3.7E-05	Total Hazard Index for Surface Soil and Groundwater					0.7
		Total Cancer Risk for Subsurface Soil and Groundwater										2.8E-05	Total Hazard Index for Subsurface Soil and Groundwater					0.7

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.300	mg/kg	7.2E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.3E-09	5.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.270	mg/kg	6.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.7E-08	4.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.430	mg/kg	1.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.5E-09	7.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.360	mg/kg	8.6E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	6.3E-11	6.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	1.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.1E-08	1.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	4.3E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.2E-09	3.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	16.4	mg/kg	3.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	5.9E-07	2.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.09	
				Beryllium	3.50	mg/kg	8.4E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.9E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.001	
				Cadmium	13.0	mg/kg	3.1E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.2E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.04	
				Chromium VI	91.1	mg/kg	2.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.1E-06	1.5E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.008	
				Cobalt	17.8	mg/kg	4.3E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.0E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.010	
				Iron	30,020	mg/kg	7.2E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.0E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.07	
				Lead	53.6	mg/kg	1.3E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Manganese	474	mg/kg	1.1E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.0E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03	
		Exp. Route Total								1.8E-06					0.3		
		Dermal	Benzo(a)anthracene	0.300	mg/kg	2.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.0E-09	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Benzo(a)pyrene	0.270	mg/kg	2.5E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.8E-08	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Benzo(b)fluoranthene	0.430	mg/kg	4.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.9E-09	2.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Chrysene	0.360	mg/kg	3.4E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	2.5E-11	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Dibenzo(a,h)anthracene	0.062	mg/kg	5.8E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.2E-09	4.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--		
			Indeno(1,2,3-cd)pyrene	0.180	mg/kg	1.7E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.2E-09	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Arsenic	16.4	mg/kg	3.5E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	5.3E-08	2.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.008		
			Beryllium	3.50	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.5E-05	(mg/kg/day)	--		
			Cadmium	13.0	mg/kg	9.4E-10	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.5E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.003		
			Chromium VI	91.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--		
			Cobalt	17.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--		
			Iron	30,020	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--		
			Lead	53.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--		
			Manganese	474	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--		
		Exp. Route Total								8.2E-08					0.01		
		Exposure Point Total										1.8E-06				0.3	
		Exposure Medium Total										1.8E-06				0.3	
Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.1E-7	mg/m ³	3.6E-10	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	4.0E-11	2.5E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(a)pyrene	1.9E-7	mg/m ³	3.3E-10	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	3.6E-10	2.3E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(b)fluoranthene	3.1E-7	mg/m ³	5.2E-10	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	5.7E-11	3.6E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Chrysene	2.6E-7	mg/m ³	4.4E-10	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	4.8E-12	3.1E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Dibenzo(a,h)anthracene	4.4E-8	mg/m ³	7.5E-11	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	9.0E-11	5.3E-09	(mg/m ³)	NA	(mg/m ³)	--		
			Indeno(1,2,3-cd)pyrene	1.3E-7	mg/m ³	2.2E-10	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	2.4E-11	1.5E-08	(mg/m ³)	NA	(mg/m ³)	--		
			Arsenic	1.2E-5	mg/m ³	2.0E-08	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	8.5E-08	1.4E-06	(mg/m ³)	1.5E-05	(mg/m ³)	0.09		
			Beryllium	2.5E-6	mg/m ³	4.2E-09	(mg/m ³)	2.4E-03	(ug/m ³) ⁻¹	1.0E-08	3.0E-07	(mg/m ³)	2.0E-05	(mg/m ³)	0.01		
			Cadmium	9.3E-6	mg/m ³	1.6E-08	(mg/m ³)	1.8E-03	(ug/m ³) ⁻¹	2.8E-08	1.1E-06	(mg/m ³)	2.0E-05	(mg/m ³)	0.06		
			Chromium VI	6.5E-5	mg/m ³	1.1E-07	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	9.3E-06	7.7E-06	(mg/m ³)	1.0E-04	(mg/m ³)	0.08		
			Cobalt	1.3E-5	mg/m ³	2.2E-08	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	1.9E-07	1.5E-06	(mg/m ³)	2.0E-05	(mg/m ³)	0.08		
			Iron	0.021	mg/m ³	3.6E-05	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.5E-03	(mg/m ³)	NA	(mg/m ³)	--		
			Lead	3.8E-5	mg/m ³	6.5E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.5E-06	(mg/m ³)	NA	(mg/m ³)	--		
			Manganese	3.4E-4	mg/m ³	5.7E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.0E-05	(mg/m ³)	5.0E-05	(mg/m ³)	0.8		
		Exp. Route Total								9.6E-06					1.1		
		Exposure Point Total										9.6E-06				1.1	
		Exposure Medium Total										9.6E-06				1.1	
		Medium Total										1.1E-05				1.4	

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations						
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient			
							Value	Units	Value	Units		Value	Units	Value	Units				
Subsurface Soil	Subsurface Soil	Former Building 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	1.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	9.6E-09	9.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
				Aluminum	12,600	mg/kg	3.0E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.1E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02			
				Arsenic	23.3	mg/kg	5.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	8.4E-07	3.9E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1			
				Chromium VI	25.4	mg/kg	6.1E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	3.0E-07	4.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.002			
				Cobalt	13.3	mg/kg	3.2E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.2E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.007			
				Iron	31,600	mg/kg	7.6E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.3E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.08			
				Manganese	684	mg/kg	1.6E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.1E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.05			
				Exp. Route Total								1.2E-06					0.3		
			Dermal	Benzo(a)pyrene	0.055	mg/kg	5.1E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.8E-09	3.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
				Aluminum	12,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--			
				Arsenic	23.3	mg/kg	5.0E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	7.5E-08	3.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01			
				Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--			
				Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--			
				Iron	31,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--			
				Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--			
				Exp. Route Total								7.9E-08					0.01		
		Exposure Point Total									1.2E-06					0.3			
		Exposure Medium Total										1.2E-06					0.3		
		Air	Former Building 234	Inhalation	Benzo(a)pyrene	3.9E-8	mg/m³	6.7E-11	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	7.3E-11	4.7E-09	(mg/m³)	NA	(mg/m³)	--		
					Aluminum	0.009	mg/m³	1.5E-05	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.1E-03	(mg/m³)	5.0E-03	(mg/m³)	0.2		
					Arsenic	1.7E-5	mg/m³	2.8E-08	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	1.2E-07	2.0E-06	(mg/m³)	1.5E-05	(mg/m³)	0.1		
					Chromium VI	1.8E-5	mg/m³	3.1E-08	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	2.6E-06	2.2E-06	(mg/m³)	1.0E-04	(mg/m³)	0.02		
					Cobalt	9.5E-6	mg/m³	1.6E-08	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	1.5E-07	1.1E-06	(mg/m³)	2.0E-05	(mg/m³)	0.06		
					Iron	0.023	mg/m³	3.8E-05	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.7E-03	(mg/m³)	NA	(mg/m³)	--		
					Manganese	4.9E-4	mg/m³	8.3E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	5.8E-05	(mg/m³)	5.0E-05	(mg/m³)	1.2		
					Exp. Route Total								2.9E-06					1.6	
				Exposure Point Total									2.9E-06					1.6	
				Exposure Medium Total										2.9E-06					1.6
				Medium Total										4.1E-06					1.9
Groundwater	Groundwater			Former Building 234	Ingestion	cis-1,2-Dichloroethene	12.7	ug/L	4.6E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.2E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0002	
						Trichloroethene	3.90	ug/L	1.4E-08	(mg/kg/day)	4.6E-02	(mg/kg/day) ⁻¹	6.5E-10	9.9E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.002	
		Vinyl Chloride	0.263			ug/L	9.6E-10	(mg/kg/day)	7.2E-01	(mg/kg/day) ⁻¹	6.9E-10	6.7E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0002			
		Aluminum	53.7			ug/L	2.0E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00001			
		Arsenic	1.32			ug/L	4.8E-09	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	7.2E-09	3.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001			
		Cobalt	1.74			ug/L	6.3E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.4E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0001			
		Iron	459			ug/L	1.7E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0002			
		Manganese	532			ug/L	1.9E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.006			
		Exp. Route Total										8.5E-09					0.009		
		Dermal	cis-1,2-Dichloroethene		12.7	ug/L	2.8E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.0E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0010			
			Trichloroethene		3.90	ug/L	9.6E-08	(mg/kg/day)	4.6E-02	(mg/kg/day) ⁻¹	4.4E-09	6.7E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.01			
			Vinyl Chloride		0.263	ug/L	2.9E-09	(mg/kg/day)	7.2E-01	(mg/kg/day) ⁻¹	2.1E-09	2.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0007			
			Aluminum		53.7	ug/L	1.0E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.2E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000007			
			Arsenic		1.32	ug/L	2.5E-09	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.8E-09	1.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0006			
			Cobalt		1.74	ug/L	1.3E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.3E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00003			
			Iron		459	ug/L	8.8E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.2E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00009			
			Manganese		532	ug/L	1.0E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.1E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.07			
			Exp. Route Total									1.0E-08					0.09		
		Exposure Point Total									1.9E-08					0.10			
		Exposure Medium Total										1.9E-08					0.10		

TABLE 7.7 RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
 Receptor Population: Construction Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Groundwater	Air	Former Building 234	Inhalation	cis-1,2-Dichloroethene	4.7E-4	mg/m³	8.0E-07	(mg/m³)	NA	(ug/m³)⁻¹	--	5.6E-05	(mg/m³)	NA	(mg/m³)	--	
				Trichloroethene	1.3E-4	mg/m³	2.1E-07	(mg/m³)	4.1E-06	(ug/m³)⁻¹	8.7E-10	1.5E-05	(mg/m³)	5.4E-01	(mg/m³)	0.00003	
				Vinyl Chloride	1.2E-5	mg/m³	2.1E-08	(mg/m³)	4.4E-06	(ug/m³)⁻¹	9.2E-11	1.5E-06	(mg/m³)	7.7E-02	(mg/m³)	0.00002	
				Aluminum	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-03	(mg/m³)	--	
				Arsenic	0.0E+0	mg/m³	0.0E+00	(mg/m³)	4.3E-03	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	1.5E-05	(mg/m³)	--	
				Cobalt	0.0E+0	mg/m³	0.0E+00	(mg/m³)	9.0E-03	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	2.0E-05	(mg/m³)	--	
				Iron	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	NA	(mg/m³)	--	
				Manganese	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-05	(mg/m³)	--	
				Exp. Route Total								9.7E-10					0.00005
		Exposure Point Total								9.7E-10					0.00005		
	Exposure Medium Total								9.7E-10					0.00005			
Medium Total									2.0E-08					0.10			
Total Cancer Risks for Surface Soil and Groundwater											1.1E-05	Total Hazard Indices for Surface Soil and Groundwater					1.5
Total Cancer Risks for Subsurface Soil and Groundwater											4.1E-06	Total Hazard Indices for Subsurface Soil and Groundwater					2.0

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DEREKOTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.300	mg/kg	1.8E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.3E-06	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.270	mg/kg	1.6E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.2E-05	3.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.430	mg/kg	2.5E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.8E-06	5.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.360	mg/kg	2.1E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.5E-08	4.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	3.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.6E-06	7.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	1.1E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.7E-07	2.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	16.4	mg/kg	1.8E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.7E-05	2.1E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.7	
				Beryllium	3.50	mg/kg	3.8E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.5E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.02	
				Cadmium	13.0	mg/kg	1.4E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.3	
				Chromium VI	91.1	mg/kg	5.3E-04	(mg/kg/day)	5.0E+01	(mg/kg/day) ⁻¹	2.7E-04	1.2E-03	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.4	
				Cobalt	17.8	mg/kg	2.0E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.3E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.8	
				Iron	30,020	mg/kg	3.3E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.6E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.5	
				Lead	53.6	mg/kg	5.9E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.9E-04	(mg/kg/day)	NA	(mg/kg/day)	--	
				Manganese	474	mg/kg	5.2E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.1E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.3	
			Exp. Route Total								3.1E-04					3.0	
			Dermal	Benzo(a)anthracene	0.300	mg/kg	6.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.7E-07	1.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.270	mg/kg	5.7E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.2E-06	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.430	mg/kg	9.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.7E-07	2.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.360	mg/kg	7.7E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	5.6E-09	1.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	1.3E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	9.6E-07	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
		Indeno(1,2,3-cd)pyrene		0.180	mg/kg	3.8E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.8E-07	8.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
		Arsenic		16.4	mg/kg	1.5E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.3E-06	1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06		
		Beryllium		3.50	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	--		
		Cadmium		13.0	mg/kg	4.0E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.7E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.02		
		Chromium VI		91.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--		
		Cobalt	17.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--			
		Iron	30,020	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--			
		Lead	53.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--			
		Manganese	474	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--			
		Exp. Route Total								8.8E-06					0.08		
		Exposure Point Total									3.2E-04					3.1	
		Exposure Medium Total										3.2E-04					3.1
Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	1.2E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.3E-12	2.6E-11	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	2.5E-11	mg/m³	1.1E-11	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	1.2E-11	2.4E-11	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	3.9E-11	mg/m³	1.7E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.9E-12	3.7E-11	(mg/m³)	NA	(mg/m³)	--		
			Chrysene	3.3E-11	mg/m³	1.4E-11	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	1.6E-13	3.1E-11	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	5.6E-12	mg/m³	2.5E-12	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	3.0E-12	5.4E-12	(mg/m³)	NA	(mg/m³)	--		
			Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m³	7.2E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	7.9E-13	1.6E-11	(mg/m³)	NA	(mg/m³)	--		
			Arsenic	1.5E-9	mg/m³	1.2E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	5.3E-10	1.4E-09	(mg/m³)	1.5E-05	(mg/m³)	0.00010		
			Beryllium	3.2E-10	mg/m³	2.6E-11	(mg/m³)	2.4E-03	(ug/m³) ⁻¹	6.3E-11	3.1E-10	(mg/m³)	2.0E-05	(mg/m³)	0.00002		
			Cadmium	1.2E-9	mg/m³	9.7E-11	(mg/m³)	1.8E-03	(ug/m³) ⁻¹	1.7E-10	1.1E-09	(mg/m³)	2.0E-05	(mg/m³)	0.00006		
			Chromium VI	8.3E-9	mg/m³	3.6E-09	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	3.0E-07	7.9E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00008		
			Cobalt	1.6E-9	mg/m³	1.3E-10	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	1.2E-09	1.6E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003		
			Iron	2.7E-6	mg/m³	2.2E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.6E-06	(mg/m³)	NA	(mg/m³)	--		
			Lead	4.9E-9	mg/m³	4.0E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	4.7E-09	(mg/m³)	NA	(mg/m³)	--		
			Manganese	4.3E-8	mg/m³	3.5E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	4.1E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0008		
		Exp. Route Total								3.1E-07					0.001		
		Exposure Point Total									3.1E-07					0.001	
	Exposure Medium Total										3.1E-07					0.001	
Medium Total											3.2E-04				3.1		

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	Former Building 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	3.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.3E-06	7.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	12,600	mg/kg	1.4E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.6E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.2	
				Arsenic	23.3	mg/kg	2.6E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.8E-05	3.0E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.0	
				Chromium VI	25.4	mg/kg	1.5E-04	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	7.4E-05	3.2E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.1	
				Cobalt	13.3	mg/kg	1.5E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.6	
				Iron	31,600	mg/kg	3.5E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.0E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.6	
				Manganese	684	mg/kg	7.5E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.7E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.4	
				Exp. Route Total							1.1E-04					2.8	
			Dermal	Benzo(a)pyrene	0.055	mg/kg	1.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	8.5E-07	2.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	12,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	23.3	mg/kg	2.1E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.2E-06	2.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08	
				Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	31,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
				Exp. Route Total							4.1E-06					0.08	
			Exposure Point Total								1.2E-04					2.9	
	Exposure Medium Total										1.2E-04				2.9		
	Air	Former Building 234	Inhalation	Benzo(a)pyrene	5.0E-12	mg/m³	2.2E-12	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	2.4E-12	4.8E-12	(mg/m³)	NA	(mg/m³)	--	
				Aluminum	1.1E-6	mg/m³	9.4E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.1E-06	(mg/m³)	5.0E-03	(mg/m³)	0.0002	
				Arsenic	2.1E-9	mg/m³	1.7E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	7.5E-10	2.0E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001	
				Chromium VI	2.3E-9	mg/m³	1.0E-09	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	8.5E-08	2.2E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002	
				Cobalt	1.2E-9	mg/m³	9.9E-11	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	8.9E-10	1.2E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0002	
				Iron	2.9E-6	mg/m³	2.4E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.8E-06	(mg/m³)	NA	(mg/m³)	--	
				Manganese	6.2E-8	mg/m³	5.1E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	6.0E-08	(mg/m³)	5.0E-05	(mg/m³)	0.001	
				Exp. Route Total							8.7E-08					0.002	
			Exposure Point Total								8.7E-08					0.002	
	Exposure Medium Total								8.7E-08					0.002			
	Medium Total										1.2E-04				2.9		
Groundwater	Groundwater	Former Building 234	Ingestion	cis-1,2-Dichloroethene	12.7	ug/L	7.0E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.1E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.4	
				Trichloroethene (Mutagenic)	3.90	ug/L	1.1E-04	(mg/kg/day)	9.3E-03	(mg/kg/day) ⁻¹	1.1E-06	2.5E-04	(mg/kg/day)	NA	(mg/kg/day)	--	
				Trichloroethene (Nonmutagenic)	3.90	ug/L	2.1E-05	(mg/kg/day)	3.7E-02	(mg/kg/day) ⁻¹	7.8E-07	2.5E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.5	
				Vinyl Chloride	0.263	ug/L	1.9E-05	(mg/kg/day)	7.2E-01	(mg/kg/day) ⁻¹	1.4E-05	1.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006	
				Aluminum	53.7	ug/L	2.9E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.4E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003	
				Arsenic	1.32	ug/L	7.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.1E-05	8.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.3	
				Cobalt	1.74	ug/L	9.5E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.1E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.4	
				Iron	459	ug/L	2.5E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.9E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04	
				Manganese	532	ug/L	2.9E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.4E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	1.4	
				Exp. Route Total							2.6E-05					3.0	
			Dermal	cis-1,2-Dichloroethene	12.7	ug/L	8.6E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.0E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.05	
				Trichloroethene (Mutagenic)	3.90	ug/L	1.8E-05	(mg/kg/day)	9.3E-03	(mg/kg/day) ⁻¹	1.7E-07	4.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Trichloroethene (Nonmutagenic)	3.90	ug/L	3.5E-06	(mg/kg/day)	3.7E-02	(mg/kg/day) ⁻¹	1.3E-07	4.0E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.08	
				Vinyl Chloride	0.263	ug/L	1.0E-06	(mg/kg/day)	7.2E-01	(mg/kg/day) ⁻¹	7.4E-07	9.1E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0003	
				Aluminum	53.7	ug/L	1.9E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.3E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00002	
				Arsenic	1.32	ug/L	4.8E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	7.2E-08	5.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002	
				Cobalt	1.74	ug/L	2.5E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0010	
				Iron	459	ug/L	1.7E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.9E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0003	
				Manganese	532	ug/L	1.9E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.2E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.2	
				Exp. Route Total							1.1E-06					0.4	
			Exposure Point Total								2.7E-05					3.4	
	Exposure Medium Total										2.7E-05				3.4		

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Groundwater	Air	Former Building 234	Inhalation	cis-1,2-Dichloroethene	0.006	mg/m³	5.2E-04	(mg/m³)	NA	(ug/m³)⁻¹	--	6.1E-03	(mg/m³)	NA	(mg/m³)	--	
				Trichloroethene (Mutagenic)	0.002	mg/m³	8.5E-04	(mg/m³)	1.0E-06	(ug/m³)⁻¹	8.5E-07	1.9E-03	(mg/m³)	NA	(mg/m³)	--	
				Trichloroethene (Nonmutagenic)	0.002	mg/m³	1.6E-04	(mg/m³)	3.1E-06	(ug/m³)⁻¹	5.0E-07	1.9E-03	(mg/m³)	2.0E-03	(mg/m³)	0.9	
				Vinyl Chloride	1.3E-4	mg/m³	1.4E-04	(mg/m³)	4.4E-06	(ug/m³)⁻¹	6.3E-07	1.3E-04	(mg/m³)	1.0E-01	(mg/m³)	0.001	
				Aluminum	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-03	(mg/m³)	--	
				Arsenic	0.0E+0	mg/m³	0.0E+00	(mg/m³)	4.3E-03	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	1.5E-05	(mg/m³)	--	
				Cobalt	0.0E+0	mg/m³	0.0E+00	(mg/m³)	9.0E-03	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	6.0E-06	(mg/m³)	--	
				Iron	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	NA	(mg/m³)	--	
				Manganese	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-05	(mg/m³)	--	
				Exp. Route Total								2.0E-06					0.9
		Exposure Point Total									2.0E-06					0.9	
	Exposure Medium Total										2.0E-06					0.9	
Medium Total											2.9E-05				4.3		
Total Cancer Risks for Surface Soil and Groundwater											3.5E-04	Total Hazard Indices for Surface Soil and Groundwater					7
Total Cancer Risks for Subsurface Soil and Groundwater											1.5E-04	Total Hazard Indices for Subsurface Soil and Groundwater					8

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RFC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Benzo(a)anthracene	0.300	mg/kg	2.6E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.9E-07	4.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.270	mg/kg	2.3E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.7E-06	3.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.430	mg/kg	3.7E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.7E-07	5.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.360	mg/kg	3.1E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	2.3E-09	4.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.062	mg/kg	5.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.9E-07	8.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.180	mg/kg	1.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.1E-07	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	16.4	mg/kg	7.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.2E-05	2.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07	
				Beryllium	3.50	mg/kg	1.6E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.8E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.002	
				Cadmium	13.0	mg/kg	6.1E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.04	
				Chromium VI	91.1	mg/kg	7.8E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	3.9E-05	1.2E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.04	
				Cobalt	17.8	mg/kg	8.4E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08	
				Iron	30,020	mg/kg	1.4E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06	
				Lead	53.6	mg/kg	2.5E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Manganese	474	mg/kg	2.2E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03	
		Exp. Route Total								5.3E-05					0.3		
		Dermal	Benzo(a)anthracene	0.300	mg/kg	1.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	9.8E-08	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Benzo(a)pyrene	0.270	mg/kg	1.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	8.8E-07	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Benzo(b)fluoranthene	0.430	mg/kg	1.9E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.4E-07	3.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Chrysene	0.360	mg/kg	1.6E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.2E-09	2.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Dibenzo(a,h)anthracene	0.062	mg/kg	2.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.0E-07	4.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--		
			Indeno(1,2,3-cd)pyrene	0.180	mg/kg	8.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.9E-08	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
			Arsenic	16.4	mg/kg	9.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.4E-06	2.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009		
			Beryllium	3.50	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.4E-05	(mg/kg/day)	--		
			Cadmium	13.0	mg/kg	2.4E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.1E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.003		
			Chromium VI	91.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--		
			Cobalt	17.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--		
			Iron	30,020	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--		
			Lead	53.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--		
			Manganese	474	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--		
		Exp. Route Total								2.8E-06					0.01		
		Exposure Point Total								5.6E-05					0.3		
		Exposure Medium Total								5.6E-05					0.3		
Air	Former Building 234	Inhalation	Benzo(a)anthracene	2.7E-11	mg/m³	1.6E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.8E-12	2.6E-11	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	2.5E-11	mg/m³	1.5E-11	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	1.6E-11	2.4E-11	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	3.9E-11	mg/m³	2.4E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.6E-12	3.7E-11	(mg/m³)	NA	(mg/m³)	--		
			Chrysene	3.3E-11	mg/m³	2.0E-11	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	2.2E-13	3.1E-11	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	5.6E-12	mg/m³	3.4E-12	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	4.1E-12	5.4E-12	(mg/m³)	NA	(mg/m³)	--		
			Indeno(1,2,3-cd)pyrene	1.6E-11	mg/m³	9.9E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.1E-12	1.6E-11	(mg/m³)	NA	(mg/m³)	--		
			Arsenic	1.5E-9	mg/m³	4.9E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	2.1E-09	1.4E-09	(mg/m³)	1.5E-05	(mg/m³)	0.00010		
			Beryllium	3.2E-10	mg/m³	1.0E-10	(mg/m³)	2.4E-03	(ug/m³) ⁻¹	2.5E-10	3.1E-10	(mg/m³)	2.0E-05	(mg/m³)	0.00002		
			Cadmium	1.2E-9	mg/m³	3.9E-10	(mg/m³)	1.8E-03	(ug/m³) ⁻¹	7.0E-10	1.1E-09	(mg/m³)	2.0E-05	(mg/m³)	0.00006		
			Chromium VI	8.3E-9	mg/m³	5.0E-09	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	4.2E-07	7.9E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00008		
			Cobalt	1.6E-9	mg/m³	5.3E-10	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	4.8E-09	1.6E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003		
			Iron	2.7E-6	mg/m³	9.0E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.6E-06	(mg/m³)	NA	(mg/m³)	--		
			Lead	4.9E-9	mg/m³	1.6E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	4.7E-09	(mg/m³)	NA	(mg/m³)	--		
			Manganese	4.3E-8	mg/m³	1.4E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	4.1E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0008		
		Exp. Route Total								4.3E-07					0.001		
		Exposure Point Total								4.3E-07					0.001		
		Exposure Medium Total								4.3E-07					0.001		
		Medium Total								5.7E-05					0.3		

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	Former Building 234	Ingestion	Benzo(a)pyrene	0.055	mg/kg	4.7E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.5E-07	7.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	12,600	mg/kg	5.9E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02	
				Arsenic	23.3	mg/kg	1.1E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.6E-05	3.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1	
				Chromium VI	25.4	mg/kg	2.2E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.1E-05	3.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01	
				Cobalt	13.3	mg/kg	6.2E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06	
				Iron	31,600	mg/kg	1.5E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.3E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06	
				Manganese	684	mg/kg	3.2E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04	
				Exp. Route Total							2.8E-05					0.3	
			Dermal	Benzo(a)pyrene	0.055	mg/kg	2.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.8E-07	3.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	12,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	23.3	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.0E-06	3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Chromium VI	25.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	13.3	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	31,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	684	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
				Exp. Route Total							2.1E-06					0.01	
			Exposure Point Total								3.0E-05					0.3	
		Exposure Medium Total								3.0E-05					0.3		
		Air	Former Building 234	Inhalation	Benzo(a)pyrene	5.0E-12	mg/m ³	3.0E-12	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	3.3E-12	4.8E-12	(mg/m ³)	NA	(mg/m ³)	--
					Aluminum	1.1E-6	mg/m ³	3.8E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.1E-06	(mg/m ³)	5.0E-03	(mg/m ³)	0.0002
					Arsenic	2.1E-9	mg/m ³	7.0E-10	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	3.0E-09	2.0E-09	(mg/m ³)	1.5E-05	(mg/m ³)	0.0001
					Chromium VI	2.3E-9	mg/m ³	1.4E-09	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.2E-07	2.2E-09	(mg/m ³)	1.0E-04	(mg/m ³)	0.00002
					Cobalt	1.2E-9	mg/m ³	4.0E-10	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	3.6E-09	1.2E-09	(mg/m ³)	6.0E-06	(mg/m ³)	0.0002
					Iron	2.9E-6	mg/m ³	9.4E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.8E-06	(mg/m ³)	NA	(mg/m ³)	--
					Manganese	6.2E-8	mg/m ³	2.0E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.0E-08	(mg/m ³)	5.0E-05	(mg/m ³)	0.001
					Exp. Route Total							1.2E-07					0.002
				Exposure Point Total								1.2E-07					0.002
				Exposure Medium Total								1.2E-07					0.002
				Medium Total								3.0E-05					0.3
Groundwater	Groundwater			Former Building 234	Ingestion	cis-1,2-Dichloroethene	12.7	ug/L	1.2E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.5E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)
		Trichloroethene (Mutagenic)	3.90			ug/L	6.7E-05	(mg/kg/day)	9.3E-03	(mg/kg/day) ⁻¹	6.2E-07	1.1E-04	(mg/kg/day)	NA	(mg/kg/day)	--	
		Trichloroethene (Nonmutagenic)	3.90			ug/L	3.7E-05	(mg/kg/day)	3.7E-02	(mg/kg/day) ⁻¹	1.3E-06	1.1E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.2	
		Vinyl Chloride	0.263			ug/L	2.5E-06	(mg/kg/day)	7.2E-01	(mg/kg/day) ⁻¹	1.8E-06	7.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002	
		Aluminum	53.7			ug/L	5.0E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.001	
		Arsenic	1.32			ug/L	1.2E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.9E-05	3.6E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1	
		Cobalt	1.74			ug/L	1.6E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.2	
		Iron	459			ug/L	4.3E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.02	
		Manganese	532			ug/L	5.0E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.5E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.6	
		Exp. Route Total									2.2E-05					1.3	
		Dermal	cis-1,2-Dichloroethene		12.7	ug/L	1.5E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.3E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.02	
			Trichloroethene (Mutagenic)		3.90	ug/L	1.1E-05	(mg/kg/day)	9.3E-03	(mg/kg/day) ⁻¹	1.0E-07	1.8E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
			Trichloroethene (Nonmutagenic)		3.90	ug/L	6.2E-06	(mg/kg/day)	3.7E-02	(mg/kg/day) ⁻¹	2.3E-07	1.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.04	
			Vinyl Chloride		0.263	ug/L	1.3E-07	(mg/kg/day)	7.2E-01	(mg/kg/day) ⁻¹	9.5E-08	3.8E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0001	
			Aluminum		53.7	ug/L	2.6E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.7E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00008	
			Arsenic		1.32	ug/L	6.5E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	9.7E-08	1.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0006	
			Cobalt		1.74	ug/L	3.4E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0003	
			Iron		459	ug/L	2.3E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.6E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00008	
			Manganese		532	ug/L	2.6E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.6E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.08	
			Exp. Route Total								5.2E-07					0.1	
		Exposure Point Total									2.3E-05					1.4	
		Exposure Medium Total								2.3E-05					1.4		

TABLE 7.9.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
 Receptor Population: Residents
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Groundwater	Air	Former Building 234	Inhalation	cis-1,2-Dichloroethene	0.006	mg/m³	2.1E-03	(mg/m³)	NA	(ug/m³)⁻¹	--	6.1E-03	(mg/m³)	NA	(mg/m³)	--	
				Trichloroethene (Mutagenic)	0.002	mg/m³	1.2E-03	(mg/m³)	1.0E-06	(ug/m³)⁻¹	1.2E-06	1.9E-03	(mg/m³)	NA	(mg/m³)	--	
				Trichloroethene (Nonmutagenic)	0.002	mg/m³	6.4E-04	(mg/m³)	3.1E-06	(ug/m³)⁻¹	2.0E-06	1.9E-03	(mg/m³)	2.0E-03	(mg/m³)	0.9	
				Vinyl Chloride	1.3E-4	mg/m³	4.3E-05	(mg/m³)	4.4E-06	(ug/m³)⁻¹	1.9E-07	1.3E-04	(mg/m³)	1.0E-01	(mg/m³)	0.001	
				Aluminum	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-03	(mg/m³)	--	
				Arsenic	0.0E+0	mg/m³	0.0E+00	(mg/m³)	4.3E-03	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	1.5E-05	(mg/m³)	--	
				Cobalt	0.0E+0	mg/m³	0.0E+00	(mg/m³)	9.0E-03	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	6.0E-06	(mg/m³)	--	
				Iron	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	NA	(mg/m³)	--	
				Manganese	0.0E+0	mg/m³	0.0E+00	(mg/m³)	NA	(ug/m³)⁻¹	--	0.0E+00	(mg/m³)	5.0E-05	(mg/m³)	--	
				Exp. Route Total								3.4E-06				0.9	
		Exposure Point Total								3.4E-06				0.9			
	Exposure Medium Total								3.4E-06				0.9				
Medium Total											2.6E-05				2.4		
Total Cancer Risks for Surface Soil and Groundwater											8.3E-05	Total Hazard Indices for Surface Soil and Groundwater					2.7
Total Cancer Risks for Subsurface Soil and Groundwater											5.6E-05	Total Hazard Indices for Subsurface Soil and Groundwater					2.7

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

South Waterfront

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CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.

Reasonable Maximum Exposures

7.1.RME	Future Adolescent Trespassers - South Waterfront
7.2.RME	Future Adult Trespassers - South Waterfront
7.3.RME	Future Industrial Workers - South Waterfront
7.4.RME	Current/Future Construction Workers - North Waterfront
7.5.RME	Hypothetical Child Residents - South Waterfront
7.6.RME	Hypothetical Adult Residents - South Waterfront

TABLE 7.3.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
 Receptor Population: Industrial Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations							
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient			
							Value	Units	Value	Units		Value	Units	Value	Units				
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	5.5E-03	(mg/kg/day)	NA	(mg/kg/day) ¹	--	1.5E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02			
				Arsenic	23.7	mg/kg	8.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	1.2E-05	2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08			
				Chromium VI	19.1	mg/kg	6.7E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ¹	3.3E-06	1.9E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006			
				Cobalt	23.6	mg/kg	8.3E-06	(mg/kg/day)	NA	(mg/kg/day) ¹	--	2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08			
				Iron	41,800	mg/kg	1.5E-02	(mg/kg/day)	NA	(mg/kg/day) ¹	--	4.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06			
			Exp. Route Total							1.6E-05					0.2				
			Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--			
				Arsenic	23.7	mg/kg	1.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	2.5E-06	4.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02			
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--			
				Cobalt	23.6	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--			
				Iron	41,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--			
			Exp. Route Total							2.5E-06					0.02				
		Exposure Point Total								1.8E-05					0.3				
	Exposure Medium Total								1.8E-05					0.3					
	Air	South Waterfront	Inhalation	Aluminum	1.4E-6	mg/m ³	1.2E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	3.3E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.00007			
				Arsenic	2.2E-9	mg/m ³	1.8E-10	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	7.8E-10	4.9E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.00003			
				Chromium VI	1.7E-9	mg/m ³	1.4E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.2E-08	4.0E-10	(mg/m ³)	1.0E-04	(mg/m ³)	0.000004			
				Cobalt	2.2E-9	mg/m ³	1.8E-10	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	1.6E-09	4.9E-10	(mg/m ³)	6.0E-06	(mg/m ³)	0.00008			
				Iron	3.8E-6	mg/m ³	3.1E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	8.7E-07	(mg/m ³)	NA	(mg/m ³)	--			
			Exp. Route Total							1.4E-08					0.0002				
			Exposure Point Total							1.4E-08					0.0002				
			Exposure Medium Total							1.4E-08					0.0002				
			Medium Total							1.8E-05					0.3				
			Total of Receptor Risks Across All Media										1.8E-05	Total of Receptor Hazards Across All Media					0.3

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	5.9E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.004	
				Arsenic	23.7	mg/kg	8.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.3E-06	6.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Chromium VI	19.1	mg/kg	2.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.1E-06	5.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002	
				Cobalt	23.8	mg/kg	8.9E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Iron	41,800	mg/kg	1.6E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.02	
			Exp. Route Total								2.4E-06					0.06	
			Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	5.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	8.8E-07	4.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	23.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	41,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
			Exp. Route Total								8.8E-07					0.01	
		Exposure Point Total									3.3E-06					0.08	
	Exposure Medium Total									3.3E-06					0.08		
	Air	South Waterfront	Inhalation	Aluminum	1.4E-6	mg/m³	4.5E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.1E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000006	
				Arsenic	2.2E-9	mg/m³	6.7E-12	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	2.9E-11	4.7E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003	
				Chromium VI	1.7E-9	mg/m³	1.6E-11	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	1.4E-09	3.8E-11	(mg/m³)	1.0E-04	(mg/m³)	3.8E-7	
				Cobalt	2.2E-9	mg/m³	6.8E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	6.1E-11	4.7E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000008	
				Iron	3.8E-6	mg/m³	1.2E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	8.3E-08	(mg/m³)	NA	(mg/m³)	--	
			Exp. Route Total								1.5E-09					0.00002	
			Exposure Point Total								1.5E-09					0.00002	
		Exposure Medium Total									1.5E-09					0.00002	
	Medium Total									3.3E-06					0.08		
Total of Receptor Risks Across All Media											3.3E-06	Total of Receptor Hazards Across All Media					0.08

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	8.5E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.0E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
				Arsenic	23.7	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.9E-06	4.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	19.1	mg/kg	1.0E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	5.1E-07	3.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001
				Cobalt	23.8	mg/kg	1.3E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Iron	41,800	mg/kg	2.2E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
			Exp. Route Total								2.4E-06					0.05
			Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				Arsenic	23.7	mg/kg	1.5E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.3E-07	5.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				Cobalt	23.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Iron	41,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
			Exp. Route Total								2.3E-07					0.002
		Exposure Point Total								2.6E-06					0.05	
	Exposure Medium Total								2.6E-06					0.05		
	Air	South Waterfront	Inhalation	Aluminum	1.4E-6	mg/m ³	9.0E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	3.1E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000006
				Arsenic	2.2E-9	mg/m ³	1.3E-11	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	5.8E-11	4.7E-11	(mg/m ³)	1.5E-05	(mg/m ³)	0.000003
				Chromium VI	1.7E-9	mg/m ³	1.1E-11	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	9.1E-10	3.8E-11	(mg/m ³)	1.0E-04	(mg/m ³)	3.8E-7
				Cobalt	2.2E-9	mg/m ³	1.4E-11	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	1.2E-10	4.7E-11	(mg/m ³)	6.0E-06	(mg/m ³)	0.000008
				Iron	3.8E-6	mg/m ³	2.4E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	8.3E-08	(mg/m ³)	NA	(mg/m ³)	--
			Exp. Route Total								1.1E-09					0.00002
		Exposure Point Total								1.1E-09					0.00002	
	Exposure Medium Total								1.1E-09					0.00002		
	Medium Total									2.7E-06					0.05	
								Total of Receptor Risks Across All Media				2.7E-06	Total of Receptor Hazards Across All Media			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early Life Exposure to Carcinogens (2005).

TABLE 7.4 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	3.8E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.7E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.03
				Arsenic	23.7	mg/kg	5.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	8.5E-07	4.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Chromium VI	19.1	mg/kg	4.6E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	2.3E-07	3.2E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.002
				Cobalt	23.8	mg/kg	5.7E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.0E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01
				Iron	41,800	mg/kg	1.0E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.0E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.1
			Exp. Route Total								1.1E-06					0.3
			Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				Arsenic	23.7	mg/kg	5.1E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	7.7E-08	3.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
				Cobalt	23.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--
				Iron	41,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
			Exp. Route Total								7.7E-08					0.01
		Exposure Point Total									1.2E-06					0.3
	Exposure Medium Total										1.2E-06					0.3
	Air	South Waterfront	Inhalation	Aluminum	0.011	mg/m ³	1.9E-05	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.3E-03	(mg/m ³)	5.0E-03	(mg/m ³)	0.3
				Arsenic	1.7E-5	mg/m ³	2.9E-08	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	1.2E-07	2.0E-06	(mg/m ³)	1.5E-05	(mg/m ³)	0.1
				Chromium VI	1.4E-5	mg/m ³	2.3E-08	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.9E-06	1.6E-06	(mg/m ³)	1.0E-04	(mg/m ³)	0.02
				Cobalt	1.7E-5	mg/m ³	2.9E-08	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	2.6E-07	2.0E-06	(mg/m ³)	2.0E-05	(mg/m ³)	0.1
				Iron	0.030	mg/m ³	5.1E-05	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	3.5E-03	(mg/m ³)	NA	(mg/m ³)	--
			Exp. Route Total								2.3E-06					0.5
			Exposure Point Total								2.3E-06					0.5
		Exposure Medium Total									2.3E-06					0.5
	Medium Total										3.5E-06					0.8
	Total of Receptor Risks Across All Media										3.5E-06	Total of Receptor Hazards Across All Media				0.8

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations							
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient				
							Value	Units	Value	Units		Value	Units	Value	Units					
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	1.7E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.0E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.2				
				Arsenic	23.7	mg/kg	2.6E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.9E-05	3.0E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.0				
				Chromium VI	19.1	mg/kg	1.1E-04	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	5.6E-05	2.4E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.08				
				Cobalt	23.8	mg/kg	2.6E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.0E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.0				
				Iron	41,800	mg/kg	4.6E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.3E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.8				
			Exp. Route Total							9.5E-05					3.1					
			Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--				
				Arsenic	23.7	mg/kg	2.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.3E-06	2.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08				
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--				
				Cobalt	23.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--				
				Iron	41,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--				
			Exp. Route Total							3.3E-06					0.08					
		Exposure Point Total							9.8E-05					3.2						
	Exposure Medium Total							9.8E-05					3.2							
	Air	South Waterfront	Inhalation	Aluminum	1.4E-6	mg/m ³	1.2E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.4E-06	(mg/m ³)	5.0E-03	(mg/m ³)	0.0003				
				Arsenic	2.2E-9	mg/m ³	1.8E-10	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	7.6E-10	2.1E-09	(mg/m ³)	1.5E-05	(mg/m ³)	0.0001				
				Chromium VI	1.7E-9	mg/m ³	7.6E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	6.4E-08	1.7E-09	(mg/m ³)	1.0E-04	(mg/m ³)	0.00002				
				Cobalt	2.2E-9	mg/m ³	1.8E-10	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	1.6E-09	2.1E-09	(mg/m ³)	6.0E-06	(mg/m ³)	0.0003				
				Iron	3.8E-6	mg/m ³	3.1E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	3.6E-06	(mg/m ³)	NA	(mg/m ³)	--				
			Exp. Route Total							6.6E-08					0.0008					
			Exposure Point Total							6.6E-08					0.0008					
			Exposure Medium Total							6.6E-08					0.0008					
			Medium Total							9.8E-05					3.2					
			Total of Receptor Risks Across All Media											9.8E-05	Total of Receptor Hazards Across All Media					3.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6 RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
 Receptor Population: Residents
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Aluminum	15,800	mg/kg	7.4E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02	
				Arsenic	23.7	mg/kg	1.1E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.7E-05	3.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1	
				Chromium VI	19.1	mg/kg	1.6E-05	(mg/kg/day) ¹	5.0E-01	(mg/kg/day) ⁻¹	8.2E-06	2.6E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.009	
				Cobalt	23.8	mg/kg	1.1E-05	(mg/kg/day)	NA	(mg/kg/day) ¹	--	3.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1	
				Iron	41,800	mg/kg	2.0E-02	(mg/kg/day)	NA	(mg/kg/day) ¹	--	5.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.08	
			Exp. Route Total								2.5E-05					0.3	
			Dermal	Aluminum	15,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	23.7	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	2.0E-06	3.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	23.8	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	41,800	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
			Exp. Route Total								2.0E-06					0.01	
		Exposure Point Total								2.7E-05					0.3		
	Exposure Medium Total								2.7E-05					0.3			
	Air	South Waterfront	Inhalation	Aluminum	1.4E-6	mg/m³	4.7E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.4E-06	(mg/m³)	5.0E-03	(mg/m³)	0.0003	
				Arsenic	2.2E-9	mg/m³	7.1E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	3.0E-09	2.1E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001	
				Chromium VI	1.7E-9	mg/m³	1.0E-09	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	8.8E-08	1.7E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002	
				Cobalt	2.2E-9	mg/m³	7.1E-10	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	6.4E-09	2.1E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003	
				Iron	3.8E-6	mg/m³	1.2E-06	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.6E-06	(mg/m³)	NA	(mg/m³)	--	
			Exp. Route Total								9.7E-08					0.0008	
			Exposure Point Total								9.7E-08					0.0008	
		Exposure Medium Total								9.7E-08					0.0008		
	Medium Total								2.7E-05					0.3			
Total of Receptor Risks Across All Media											2.7E-05	Total of Receptor Hazards Across All Media					0.3

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

PCB Removal Area

LIST OF TABLES
RAGS PART D TABLE 7 - PCB REMOVAL AREA
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.

Reasonable Maximum Exposures

7.1.RME	Current Adolescent Trespassers - PCB Removal Area
7.2.RME	Current Adult Trespassers - PCB Removal Area
7.3.RME	Current Industrial Workers - PCB Removal Area
7.4.RME	Future Adolescent Trespassers - PCB Removal Area
7.5.RME	Future Adult Trespassers - PCB Removal Area
7.6.RME	Future Industrial Workers - PCB Removal Area
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - PCB Removal Area
7.9.RME	Hypothetical Adult Residents - PCB Removal Area

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCo Removal Area	Ingestion	Benzo(a)anthracene	0.130	mg/kg	1.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.1E-08	3.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.120	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	9.9E-08	3.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.180	mg/kg	2.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.5E-08	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	0.072	mg/kg	2.7E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.9E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	6.3E-7	
				Benzo(k)fluoranthene	0.086	mg/kg	9.7E-09	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	7.1E-10	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.140	mg/kg	1.6E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.2E-10	3.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.017	mg/kg	2.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.4E-08	4.6E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.071	mg/kg	8.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.8E-09	1.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.024	mg/kg	9.2E-10	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	1.8E-09	6.4E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.7	mg/kg	8.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.2E-06	5.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Cobalt	22.7	mg/kg	8.5E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Iron	30,600	mg/kg	1.1E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01	
				Manganese	619	mg/kg	2.3E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.6E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.007	
			Exp. Route Total								1.4E-06					0.06	
			Dermal	Benzo(a)anthracene	0.130	mg/kg	4.2E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.1E-08	9.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.120	mg/kg	3.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.8E-07	9.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.180	mg/kg	5.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.2E-08	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	0.072	mg/kg	7.7E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.4E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000002	
				Benzo(k)fluoranthene	0.086	mg/kg	2.8E-08	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	2.0E-09	6.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.140	mg/kg	4.5E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	3.3E-10	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.017	mg/kg	5.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.1E-08	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.071	mg/kg	2.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.7E-08	5.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.024	mg/kg	2.8E-09	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	5.6E-09	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.7	mg/kg	5.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	8.1E-07	3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	30,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								1.2E-06					0.01	
			Exposure Point Total								2.6E-06					0.07	
			Exposure Medium Total								2.6E-06					0.07	
Air	PCb Removal Area	Inhalation	Benzo(a)anthracene	1.2E-11	mg/m³	1.1E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.2E-14	2.6E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	1.1E-11	mg/m³	1.0E-13	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	1.1E-13	2.4E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	1.6E-11	mg/m³	1.5E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.7E-14	3.6E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(g,h,i)perylene	6.5E-12	mg/m³	2.0E-14	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.4E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(k)fluoranthene	7.8E-12	mg/m³	7.3E-14	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	8.1E-15	1.7E-13	(mg/m³)	NA	(mg/m³)	--		
			Chrysene	1.3E-11	mg/m³	1.2E-13	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	1.3E-15	2.8E-13	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	1.6E-12	mg/m³	1.5E-14	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	1.8E-14	3.5E-14	(mg/m³)	NA	(mg/m³)	--		
			Indeno(1,2,3-cd)pyrene	6.5E-12	mg/m³	6.1E-14	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	6.7E-15	1.4E-13	(mg/m³)	NA	(mg/m³)	--		
			Total Aroclors	2.2E-12	mg/m³	6.9E-15	(mg/m³)	5.7E-04	(ug/m³) ⁻¹	4.0E-15	4.9E-14	(mg/m³)	NA	(mg/m³)	--		
			Arsenic	2.0E-9	mg/m³	6.2E-12	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	2.7E-11	4.3E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003		
			Cobalt	2.1E-9	mg/m³	6.5E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	5.8E-11	4.5E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000008		
			Iron	2.8E-6	mg/m³	8.7E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	6.1E-08	(mg/m³)	NA	(mg/m³)	--		
			Manganese	5.6E-8	mg/m³	1.8E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.2E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00002		
			Exp. Route Total								8.5E-11					0.00004	
			Exposure Point Total								8.5E-11					0.00004	
			Exposure Medium Total								8.5E-11					0.00004	
Medium Total														0.07			
Total of Receptor Risks Across All Media											2.6E-06	Total of Receptor Hazards Across All Media					0.07

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations						
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient			
							Value	Units	Value	Units		Value	Units	Value	Units				
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.130	mg/kg	7.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.1E-09	2.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
				Benzo(a)pyrene	0.120	mg/kg	6.4E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.7E-08	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
				Benzo(b)fluoranthene	0.180	mg/kg	9.7E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.1E-09	3.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
				Benzo(g,h,i)perylene	0.072	mg/kg	3.9E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	4.5E-7			
				Benzo(k)fluoranthene	0.086	mg/kg	4.6E-09	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	3.4E-10	1.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
				Chrysene	0.140	mg/kg	7.5E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	5.5E-11	2.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
				Dibenzo(a,h)anthracene	0.017	mg/kg	9.3E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.8E-09	3.3E-09	(mg/kg/day)	NA	(mg/kg/day)	--			
				Indeno(1,2,3-cd)pyrene	0.071	mg/kg	3.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.8E-09	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
				Total Aroclors	0.024	mg/kg	1.3E-09	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	2.6E-09	4.6E-09	(mg/kg/day)	NA	(mg/kg/day)	--			
				Arsenic	21.7	mg/kg	1.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.7E-06	4.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01			
				Cobalt	22.7	mg/kg	1.2E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01			
				Iron	30,600	mg/kg	1.6E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.7E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.008			
				Manganese	619	mg/kg	3.3E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005			
			Exp. Route Total								1.8E-06					0.04			
			Dermal	Benzo(a)anthracene	0.130	mg/kg	3.6E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.6E-09	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
				Benzo(a)pyrene	0.120	mg/kg	3.3E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.4E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
				Benzo(b)fluoranthene	0.180	mg/kg	5.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.7E-09	1.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
				Benzo(g,h,i)perylene	0.072	mg/kg	2.0E-09	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.0E-09	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.3E-7			
				Benzo(k)fluoranthene	0.086	mg/kg	2.4E-09	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	1.7E-10	8.4E-09	(mg/kg/day)	NA	(mg/kg/day)	--			
				Chrysene	0.140	mg/kg	3.9E-09	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	2.8E-11	1.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--			
		Dibenzo(a,h)anthracene		0.017	mg/kg	4.8E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.5E-09	1.7E-09	(mg/kg/day)	NA	(mg/kg/day)	--				
		Indeno(1,2,3-cd)pyrene		0.071	mg/kg	2.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.4E-09	6.9E-09	(mg/kg/day)	NA	(mg/kg/day)	--				
		Total Aroclors		0.024	mg/kg	7.3E-10	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	1.5E-09	2.6E-09	(mg/kg/day)	NA	(mg/kg/day)	--				
		Arsenic		21.7	mg/kg	1.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.1E-07	4.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002				
		Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--					
		Iron	30,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--					
		Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--					
		Exp. Route Total								2.5E-07					0.002				
		Exposure Point Total								2.1E-06						0.04			
		Exposure Medium Total								2.1E-06						0.04			
Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.2E-11	mg/m ³	7.4E-14	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	8.1E-15	2.6E-13	(mg/m ³)	NA	(mg/m ³)	--				
			Benzo(a)pyrene	1.1E-11	mg/m ³	6.8E-14	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	7.5E-14	2.4E-13	(mg/m ³)	NA	(mg/m ³)	--				
			Benzo(b)fluoranthene	1.6E-11	mg/m ³	1.0E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.1E-14	3.6E-13	(mg/m ³)	NA	(mg/m ³)	--				
			Benzo(g,h,i)perylene	6.5E-12	mg/m ³	4.1E-14	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.4E-13	(mg/m ³)	NA	(mg/m ³)	--				
			Benzo(k)fluoranthene	7.8E-12	mg/m ³	4.9E-14	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	5.4E-15	1.7E-13	(mg/m ³)	NA	(mg/m ³)	--				
			Chrysene	1.3E-11	mg/m ³	8.0E-14	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	8.8E-16	2.8E-13	(mg/m ³)	NA	(mg/m ³)	--				
			Dibenzo(a,h)anthracene	1.6E-12	mg/m ³	9.9E-15	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	1.2E-14	3.5E-14	(mg/m ³)	NA	(mg/m ³)	--				
			Indeno(1,2,3-cd)pyrene	6.5E-12	mg/m ³	4.0E-14	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	4.4E-15	1.4E-13	(mg/m ³)	NA	(mg/m ³)	--				
			Total Aroclors	2.2E-12	mg/m ³	1.4E-14	(mg/m ³)	5.7E-04	(ug/m ³) ⁻¹	7.9E-15	4.9E-14	(mg/m ³)	NA	(mg/m ³)	--				
			Arsenic	2.0E-9	mg/m ³	1.2E-11	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	5.3E-11	4.3E-11	(mg/m ³)	1.5E-05	(mg/m ³)	0.000003				
			Cobalt	2.1E-9	mg/m ³	1.3E-11	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	1.2E-10	4.5E-11	(mg/m ³)	6.0E-06	(mg/m ³)	0.000008				
			Iron	2.8E-6	mg/m ³	1.7E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.1E-08	(mg/m ³)	NA	(mg/m ³)	--				
			Manganese	5.6E-8	mg/m ³	3.5E-10	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.2E-09	(mg/m ³)	5.0E-05	(mg/m ³)	0.00002				
		Exp. Route Total								1.7E-10					0.00004				
		Exposure Point Total								1.7E-10						0.00004			
		Exposure Medium Total								1.7E-10						0.00004			
		Medium Total								2.1E-06						0.04			
		Total of Receptor Risks Across All Media											2.1E-06	Total of Receptor Hazards Across All Media					0.04

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.130	mg/kg	4.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.3E-08	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.120	mg/kg	4.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.1E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.180	mg/kg	6.3E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.6E-08	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	0.072	mg/kg	2.5E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.0E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000002	
				Benzo(k)fluoranthene	0.086	mg/kg	3.0E-08	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	2.2E-09	8.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.140	mg/kg	4.9E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	3.6E-10	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.017	mg/kg	6.1E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.4E-08	1.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.071	mg/kg	2.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.8E-08	6.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.024	mg/kg	8.5E-09	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	1.7E-08	2.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.7	mg/kg	7.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.1E-05	2.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07	
				Cobalt	22.7	mg/kg	7.9E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07	
				Iron	30,600	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.0E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04	
				Manganese	619	mg/kg	2.2E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.1E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03	
				Exp. Route Total							1.2E-05					0.2	
			Dermal	Benzo(a)anthracene	0.130	mg/kg	3.9E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.8E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.120	mg/kg	3.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.6E-07	1.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.180	mg/kg	5.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.9E-08	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	0.072	mg/kg	2.2E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.0E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000002	
				Benzo(k)fluoranthene	0.086	mg/kg	2.6E-08	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	1.9E-09	7.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	0.140	mg/kg	4.2E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	3.1E-10	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.017	mg/kg	5.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.8E-08	1.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	0.071	mg/kg	2.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.6E-08	6.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.024	mg/kg	7.9E-09	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	1.6E-08	2.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.7	mg/kg	1.5E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.3E-06	4.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	30,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
				Exp. Route Total							2.7E-06					0.01	
			Exposure Point Total								1.4E-05					0.2	
		Exposure Medium Total									1.4E-05					0.2	
Air	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.2E-11	mg/m ³	9.6E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.1E-13	2.7E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(a)pyrene	1.1E-11	mg/m ³	8.9E-13	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	9.8E-13	2.5E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(b)fluoranthene	1.6E-11	mg/m ³	1.3E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.5E-13	3.7E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(g,h,i)perylene	6.5E-12	mg/m ³	5.3E-13	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.5E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Benzo(k)fluoranthene	7.8E-12	mg/m ³	6.4E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	7.0E-14	1.8E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Chrysene	1.3E-11	mg/m ³	1.0E-12	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	1.1E-14	2.9E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Dibenzo(a,h)anthracene	1.6E-12	mg/m ³	1.3E-13	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	1.5E-13	3.6E-13	(mg/m ³)	NA	(mg/m ³)	--	
				Indeno(1,2,3-cd)pyrene	6.5E-12	mg/m ³	5.3E-13	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	5.8E-14	1.5E-12	(mg/m ³)	NA	(mg/m ³)	--	
				Total Aroclors	2.2E-12	mg/m ³	1.8E-13	(mg/m ³)	5.7E-04	(ug/m ³) ⁻¹	1.0E-13	5.1E-13	(mg/m ³)	NA	(mg/m ³)	--	
				Arsenic	2.0E-9	mg/m ³	1.6E-10	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	6.9E-10	4.5E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.00003	
				Cobalt	2.1E-9	mg/m ³	1.7E-10	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	1.5E-09	4.7E-10	(mg/m ³)	6.0E-06	(mg/m ³)	0.00008	
				Iron	2.8E-6	mg/m ³	2.3E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.4E-07	(mg/m ³)	NA	(mg/m ³)	--	
				Manganese	5.6E-8	mg/m ³	4.6E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.3E-08	(mg/m ³)	5.0E-05	(mg/m ³)	0.0003	
				Exp. Route Total							2.2E-09					0.0004	
			Exposure Point Total								2.2E-09					0.0004	
		Exposure Medium Total									2.2E-09					0.0004	
Medium Total											1.4E-05				0.2		
Total of Receptor Risks Across All Media											1.4E-05	Total of Receptor Hazards Across All Media					0.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	6.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.7E-07	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	4.92	mg/kg	5.5E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.0E-06	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	7.12	mg/kg	8.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.9E-07	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(g,h,i)perylene	2.07	mg/kg	7.8E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.4E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00002
				Benzo(k)fluoranthene	2.48	mg/kg	2.8E-07	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	2.0E-08	6.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	5.65	mg/kg	6.4E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	4.6E-09	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.820	mg/kg	9.2E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.7E-07	2.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	2.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.7E-07	5.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Total Aroclors	0.416	mg/kg	1.6E-08	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	3.1E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Arsenic	21.8	mg/kg	8.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.2E-06	5.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Cobalt	22.7	mg/kg	8.5E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Iron	32,000	mg/kg	1.2E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.4E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
				Manganese	619	mg/kg	2.3E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.6E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.007
			Exp. Route Total								7.2E-06					0.06
			Dermal	Benzo(a)anthracene	5.74	mg/kg	1.9E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.4E-06	4.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	4.92	mg/kg	1.6E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.2E-05	3.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	7.12	mg/kg	2.3E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.7E-06	5.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(g,h,i)perylene	2.07	mg/kg	2.2E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.6E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00005
				Benzo(k)fluoranthene	2.48	mg/kg	8.0E-07	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	5.8E-08	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	5.65	mg/kg	1.8E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.3E-08	4.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	0.820	mg/kg	2.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.9E-06	6.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	6.7E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.9E-07	1.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Total Aroclors	0.416	mg/kg	4.8E-08	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	9.6E-08	3.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Arsenic	21.8	mg/kg	5.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	8.1E-07	3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Iron	32,000	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total								1.8E-05					0.01
			Exposure Point Total								2.5E-05					0.07
			Exposure Medium Total								2.5E-05					0.07
Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	5.2E-10	mg/m³	4.9E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	5.4E-13	1.1E-11	(mg/m³)	NA	(mg/m³)	--	
			Benzo(a)pyrene	4.5E-10	mg/m³	4.2E-12	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	4.6E-12	9.8E-12	(mg/m³)	NA	(mg/m³)	--	
			Benzo(b)fluoranthene	6.5E-10	mg/m³	6.1E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	6.7E-13	1.4E-11	(mg/m³)	NA	(mg/m³)	--	
			Benzo(g,h,i)perylene	1.9E-10	mg/m³	5.9E-13	(mg/m³)	NA	(ug/m³) ⁻¹	--	4.1E-12	(mg/m³)	NA	(mg/m³)	--	
			Benzo(k)fluoranthene	2.3E-10	mg/m³	2.1E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.3E-13	4.9E-12	(mg/m³)	NA	(mg/m³)	--	
			Chrysene	5.1E-10	mg/m³	4.8E-12	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	5.3E-14	1.1E-11	(mg/m³)	NA	(mg/m³)	--	
			Dibenzo(a,h)anthracene	7.5E-11	mg/m³	7.0E-13	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	8.4E-13	1.6E-12	(mg/m³)	NA	(mg/m³)	--	
			Indeno(1,2,3-cd)pyrene	1.9E-10	mg/m³	1.8E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.9E-13	4.1E-12	(mg/m³)	NA	(mg/m³)	--	
			Total Aroclors	3.8E-11	mg/m³	1.2E-13	(mg/m³)	5.7E-04	(ug/m³) ⁻¹	6.7E-14	8.3E-13	(mg/m³)	NA	(mg/m³)	--	
			Arsenic	2.0E-9	mg/m³	6.2E-12	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	2.7E-11	4.3E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000003	
			Cobalt	2.1E-9	mg/m³	6.5E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	5.8E-11	4.5E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000008	
			Iron	2.9E-6	mg/m³	9.1E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	6.4E-08	(mg/m³)	NA	(mg/m³)	--	
			Manganese	5.6E-8	mg/m³	1.8E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.2E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00002	
		Exp. Route Total								9.2E-11				0.00004		
		Exposure Point Total								9.2E-11				0.00004		
		Exposure Medium Total								9.2E-11				0.00004		
Medium Total								2.5E-05				0.07				

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.146	mg/kg	1.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.2E-08	3.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	1.9E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.4E-07	4.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	3.6E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.6E-08	8.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	5.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.6E-08	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	6.0E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.004	
				Arsenic	35.0	mg/kg	1.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.0E-06	9.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03	
				Chromium VI	19.1	mg/kg	2.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.1E-06	5.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002	
				Cobalt	18.7	mg/kg	7.0E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Iron	37,600	mg/kg	1.4E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01	
				Manganese	872	mg/kg	3.3E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.010	
			Exp. Route Total								3.3E-06					0.08	
			Dermal	Benzo(a)anthracene	0.146	mg/kg	4.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.4E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	5.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.9E-07	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	1.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.6E-08	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	1.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.0E-07	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	35.0	mg/kg	8.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.3E-06	6.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	18.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	37,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	872	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								1.9E-06					0.02	
			Exposure Point Total										5.2E-06				0.10
			Exposure Medium Total										5.2E-06				0.10
Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.3E-11	mg/m³	1.2E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.4E-14	2.9E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	1.5E-11	mg/m³	1.4E-13	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	1.6E-13	3.3E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	2.9E-11	mg/m³	2.7E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	3.0E-14	6.4E-13	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	4.0E-12	mg/m³	3.8E-14	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	4.5E-14	8.8E-14	(mg/m³)	NA	(mg/m³)	--		
			Aluminum	1.5E-6	mg/m³	4.6E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.2E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000006		
			Arsenic	3.2E-9	mg/m³	1.0E-11	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	4.3E-11	7.0E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000005		
			Chromium VI	1.7E-9	mg/m³	1.6E-11	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	1.4E-09	3.8E-11	(mg/m³)	1.0E-04	(mg/m³)	3.8E-7		
			Cobalt	1.7E-9	mg/m³	5.3E-12	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	4.8E-11	3.7E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000006		
			Iron	3.4E-6	mg/m³	1.1E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	7.5E-08	(mg/m³)	NA	(mg/m³)	--		
			Manganese	7.9E-8	mg/m³	2.5E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.7E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00003		
		Exp. Route Total								1.5E-09					0.00005		
		Exposure Point Total										1.5E-09				0.00005	
		Exposure Medium Total										1.5E-09				0.00005	
		Medium Total										5.2E-06				0.10	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	3.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.2E-07	1.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	4.92	mg/kg	2.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.9E-06	9.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	7.12	mg/kg	3.8E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.8E-07	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	2.07	mg/kg	1.1E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.9E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00001	
				Benzo(k)fluoranthene	2.48	mg/kg	1.3E-07	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	9.7E-09	4.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	5.65	mg/kg	3.0E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	2.2E-09	1.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.820	mg/kg	4.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.2E-07	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.1E-08	3.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.416	mg/kg	2.2E-08	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	4.5E-08	7.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.8	mg/kg	1.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.8E-06	4.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Cobalt	22.7	mg/kg	1.2E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Iron	32.000	mg/kg	1.7E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.009	
				Manganese	619	mg/kg	3.3E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005	
			Exp. Route Total								4.6E-06					0.04	
			Dermal	Benzo(a)anthracene	5.74	mg/kg	1.6E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.2E-07	5.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	4.92	mg/kg	1.4E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.0E-06	4.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	7.12	mg/kg	2.0E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.4E-07	6.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	2.07	mg/kg	5.8E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.0E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000007	
				Benzo(k)fluoranthene	2.48	mg/kg	6.9E-08	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	5.0E-09	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	5.65	mg/kg	1.6E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.1E-09	5.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.820	mg/kg	2.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.7E-07	8.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	5.8E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.2E-08	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.416	mg/kg	1.2E-08	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	2.5E-08	4.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.8	mg/kg	1.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.1E-07	4.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002	
				Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	32.000	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								1.7E-06					0.002	
			Exposure Point Total								6.4E-06					0.04	
			Exposure Medium Total								6.4E-06					0.04	
Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	5.2E-10	mg/m ³	3.3E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	3.6E-13	1.1E-11	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(a)pyrene	4.5E-10	mg/m ³	2.8E-12	(mg/m ³)	1.1E-03	(ug/m ³) ⁻¹	3.1E-12	9.8E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(b)fluoranthene	6.5E-10	mg/m ³	4.1E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	4.5E-13	1.4E-11	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(g,h,i)perylene	1.9E-10	mg/m ³	1.2E-12	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.1E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Benzo(k)fluoranthene	2.3E-10	mg/m ³	1.4E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.6E-13	4.9E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Chrysene	5.1E-10	mg/m ³	3.2E-12	(mg/m ³)	1.1E-05	(ug/m ³) ⁻¹	3.5E-14	1.1E-11	(mg/m ³)	NA	(mg/m ³)	--		
			Dibenzo(a,h)anthracene	7.5E-11	mg/m ³	4.7E-13	(mg/m ³)	1.2E-03	(ug/m ³) ⁻¹	5.6E-13	1.6E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Indeno(1,2,3-cd)pyrene	1.9E-10	mg/m ³	1.2E-12	(mg/m ³)	1.1E-04	(ug/m ³) ⁻¹	1.3E-13	4.1E-12	(mg/m ³)	NA	(mg/m ³)	--		
			Total Aroclors	3.8E-11	mg/m ³	2.4E-13	(mg/m ³)	5.7E-04	(ug/m ³) ⁻¹	1.3E-13	8.3E-13	(mg/m ³)	NA	(mg/m ³)	--		
			Arsenic	2.0E-9	mg/m ³	1.2E-11	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	5.3E-11	4.3E-11	(mg/m ³)	1.5E-05	(mg/m ³)	0.000003		
			Cobalt	2.1E-9	mg/m ³	1.3E-11	(mg/m ³)	9.0E-03	(ug/m ³) ⁻¹	1.2E-10	4.5E-11	(mg/m ³)	6.0E-06	(mg/m ³)	0.000008		
			Iron	2.9E-6	mg/m ³	1.8E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.4E-06	(mg/m ³)	NA	(mg/m ³)	--		
			Manganese	5.6E-8	mg/m ³	3.5E-10	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.2E-09	(mg/m ³)	5.0E-05	(mg/m ³)	0.00002		
			Exp. Route Total								1.7E-10					0.00004	
			Exposure Point Total								1.7E-10					0.00004	
			Exposure Medium Total								1.7E-10					0.00004	
Medium Total								6.4E-06					0.04				

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.146	mg/kg	7.8E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.7E-09	2.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	9.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.5E-08	3.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	1.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.3E-08	6.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	2.4E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.7E-08	8.3E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	8.6E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.0E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003	
				Arsenic	35.0	mg/kg	1.9E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.8E-06	6.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Chromium VI	19.1	mg/kg	1.0E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	5.1E-07	3.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001	
				Cobalt	18.7	mg/kg	1.0E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Iron	37,600	mg/kg	2.0E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01	
				Manganese	872	mg/kg	4.7E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.6E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.007	
			Exp. Route Total								3.4E-06					0.05	
			Dermal	Benzo(a)anthracene	0.146	mg/kg	4.1E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.0E-09	1.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	4.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.4E-08	1.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	9.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.5E-09	3.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	1.2E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	8.9E-09	4.3E-09	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	35.0	mg/kg	2.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.4E-07	7.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.003	
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	18.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	37,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	872	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								3.9E-07					0.003	
			Exposure Point Total								3.8E-06					0.06	
			Exposure Medium Total								3.8E-06					0.06	
Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.3E-11	mg/m³	8.3E-14	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	9.1E-15	2.9E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	1.5E-11	mg/m³	9.5E-14	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	1.0E-13	3.3E-13	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	2.9E-11	mg/m³	1.8E-13	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.0E-14	6.4E-13	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	4.0E-12	mg/m³	2.5E-14	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	3.0E-14	8.8E-14	(mg/m³)	NA	(mg/m³)	--		
			Aluminum	1.5E-6	mg/m³	9.2E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.2E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000006		
			Arsenic	3.2E-9	mg/m³	2.0E-11	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	8.6E-11	7.0E-11	(mg/m³)	1.5E-05	(mg/m³)	0.000005		
			Chromium VI	1.7E-9	mg/m³	1.1E-11	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	9.1E-10	3.8E-11	(mg/m³)	1.0E-04	(mg/m³)	3.8E-7		
			Cobalt	1.7E-9	mg/m³	1.1E-11	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	9.6E-11	3.7E-11	(mg/m³)	6.0E-06	(mg/m³)	0.000006		
			Iron	3.4E-6	mg/m³	2.1E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	7.5E-08	(mg/m³)	NA	(mg/m³)	--		
			Manganese	7.9E-8	mg/m³	5.0E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.7E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00003		
			Exp. Route Total								1.1E-09					0.00005	
			Exposure Point Total								1.1E-09					0.00005	
			Exposure Medium Total								1.1E-09					0.00005	
			Medium Total								3.8E-06					0.06	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	2.0E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.5E-06	5.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	4.92	mg/kg	1.7E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.3E-05	4.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	7.12	mg/kg	2.5E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.8E-06	7.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	2.07	mg/kg	7.2E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.0E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00007	
				Benzo(k)fluoranthene	2.48	mg/kg	8.7E-07	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	6.3E-08	2.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	5.65	mg/kg	2.0E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.4E-08	5.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.820	mg/kg	2.9E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.1E-06	8.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	7.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.3E-07	2.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.416	mg/kg	1.5E-07	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	2.9E-07	4.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.8	mg/kg	7.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.1E-05	2.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07	
				Cobalt	22.7	mg/kg	7.9E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.07	
				Iron	32,000	mg/kg	1.1E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04	
				Manganese	619	mg/kg	2.2E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.1E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03	
			Exp. Route Total								3.0E-05					0.2	
			Dermal	Benzo(a)anthracene	5.74	mg/kg	1.7E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.3E-06	4.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	4.92	mg/kg	1.5E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.1E-05	4.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	7.12	mg/kg	2.1E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.6E-06	6.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	2.07	mg/kg	6.2E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00006	
				Benzo(k)fluoranthene	2.48	mg/kg	7.4E-07	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	5.4E-08	2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	5.65	mg/kg	1.7E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.2E-08	4.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.820	mg/kg	2.5E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.8E-06	6.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	6.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.5E-07	1.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.416	mg/kg	1.3E-07	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	2.7E-07	3.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.8	mg/kg	1.5E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.3E-06	4.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
				Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	32,000	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								1.8E-05					0.01	
			Exposure Point Total								4.9E-05					0.2	
			Exposure Medium Total								4.9E-05					0.2	
Air	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	5.2E-10	mg/m³	4.3E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	4.7E-12	1.2E-10	(mg/m³)	NA	(mg/m³)	--	
				Benzo(a)pyrene	4.5E-10	mg/m³	3.6E-11	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	4.0E-11	1.0E-10	(mg/m³)	NA	(mg/m³)	--	
				Benzo(b)fluoranthene	6.5E-10	mg/m³	5.3E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	5.8E-12	1.5E-10	(mg/m³)	NA	(mg/m³)	--	
				Benzo(g,h,i)perylene	1.9E-10	mg/m³	1.5E-11	(mg/m³)	NA	(ug/m³) ⁻¹	--	4.3E-11	(mg/m³)	NA	(mg/m³)	--	
				Benzo(k)fluoranthene	2.3E-10	mg/m³	1.8E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.0E-12	5.1E-11	(mg/m³)	NA	(mg/m³)	--	
				Chrysene	5.1E-10	mg/m³	4.2E-11	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	4.6E-13	1.2E-10	(mg/m³)	NA	(mg/m³)	--	
				Dibenzo(a,h)anthracene	7.5E-11	mg/m³	6.1E-12	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	7.3E-12	1.7E-11	(mg/m³)	NA	(mg/m³)	--	
				Indeno(1,2,3-cd)pyrene	1.9E-10	mg/m³	1.5E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.7E-12	4.3E-11	(mg/m³)	NA	(mg/m³)	--	
				Total Aroclors	3.8E-11	mg/m³	3.1E-12	(mg/m³)	5.7E-04	(ug/m³) ⁻¹	1.8E-12	8.6E-12	(mg/m³)	NA	(mg/m³)	--	
				Arsenic	2.0E-9	mg/m³	1.6E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	6.9E-10	4.5E-10	(mg/m³)	1.5E-05	(mg/m³)	0.00003	
				Cobalt	2.1E-9	mg/m³	1.7E-10	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	1.5E-09	4.7E-10	(mg/m³)	6.0E-06	(mg/m³)	0.00008	
				Iron	2.9E-6	mg/m³	2.4E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	6.6E-07	(mg/m³)	NA	(mg/m³)	--	
				Manganese	5.6E-8	mg/m³	4.6E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.3E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0003	
			Exp. Route Total								2.3E-09					0.0004	
			Exposure Point Total								2.3E-09					0.0004	
			Exposure Medium Total								2.3E-09					0.0004	
			Medium Total								4.9E-05					0.2	

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.146	mg/kg	5.1E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.7E-08	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	5.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	4.3E-07	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	1.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.2E-08	3.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	1.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.1E-07	4.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	5.6E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.6E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02	
				Arsenic	35.0	mg/kg	1.2E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.8E-05	3.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1	
				Chromium VI	19.1	mg/kg	6.7E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	3.3E-06	1.9E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.006	
				Cobalt	18.7	mg/kg	6.5E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06	
				Iron	37,600	mg/kg	1.3E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.05	
				Manganese	672	mg/kg	3.0E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04	
			Exp. Route Total								2.2E-05					0.3	
			Dermal	Benzo(a)anthracene	0.146	mg/kg	4.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.2E-08	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	5.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.7E-07	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	9.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	7.0E-08	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	1.3E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	9.6E-08	3.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	35.0	mg/kg	2.4E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.6E-06	6.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	18.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	37,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	672	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								4.2E-06					0.02	
			Exposure Point Total										2.7E-05				0.3
			Exposure Medium Total										2.7E-05				0.3
Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.3E-11	mg/m³	1.1E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.2E-13	3.0E-12	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	1.5E-11	mg/m³	1.2E-12	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	1.4E-12	3.5E-12	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	2.9E-11	mg/m³	2.4E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.6E-13	6.7E-12	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	4.0E-12	mg/m³	3.3E-13	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	3.9E-13	9.1E-13	(mg/m³)	NA	(mg/m³)	--		
			Aluminum	1.5E-6	mg/m³	1.2E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.3E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00007		
			Arsenic	3.2E-9	mg/m³	2.6E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	1.1E-09	7.3E-10	(mg/m³)	1.5E-05	(mg/m³)	0.00005		
			Chromium VI	1.7E-9	mg/m³	1.4E-10	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	1.2E-08	4.0E-10	(mg/m³)	1.0E-04	(mg/m³)	0.000004		
			Cobalt	1.7E-9	mg/m³	1.4E-10	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	1.2E-09	3.9E-10	(mg/m³)	6.0E-06	(mg/m³)	0.00006		
			Iron	3.4E-6	mg/m³	2.8E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	7.8E-07	(mg/m³)	NA	(mg/m³)	--		
			Manganese	7.9E-8	mg/m³	6.5E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.8E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0004		
		Exp. Route Total								1.4E-08					0.0005		
		Exposure Point Total										1.4E-08				0.0005	
		Exposure Medium Total										1.4E-08				0.0005	
		Medium Total										2.7E-05				0.3	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	1.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1E-07	9.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	4.92	mg/kg	1.2E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	9E-07	8.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	7.12	mg/kg	1.7E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1E-07	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	2.07	mg/kg	5.0E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.5E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.0001	
				Benzo(k)fluoranthene	2.48	mg/kg	6.0E-08	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	4E-09	4.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	5.65	mg/kg	1.4E-07	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1E-09	9.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.820	mg/kg	2.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1E-07	1.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	5.0E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4E-08	3.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.416	mg/kg	1.0E-08	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	2E-08	7.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.8	mg/kg	5.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	8E-07	3.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1	
				Cobalt	22.7	mg/kg	5.4E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01	
				Iron	32,000	mg/kg	7.7E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.08	
			Manganese	619	mg/kg	1.5E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.0E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04		
			Exp. Route Total								2E-06					0.2	
			Dermal	Benzo(a)anthracene	5.74	mg/kg	5.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4E-08	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	4.92	mg/kg	4.6E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3E-07	3.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	7.12	mg/kg	6.7E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5E-08	4.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	2.07	mg/kg	1.9E-08	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.4E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00005	
				Benzo(k)fluoranthene	2.48	mg/kg	2.3E-08	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	2E-09	1.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	5.65	mg/kg	5.3E-08	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	4E-10	3.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.820	mg/kg	7.7E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6E-08	5.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	1.9E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1E-08	1.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.416	mg/kg	4.2E-09	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	8E-09	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.8	mg/kg	4.7E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	7E-08	3.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01	
		Cobalt		22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--		
		Iron		32,000	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--		
		Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--			
		Exp. Route Total								5E-07					0.01		
		Exposure Point Total								3E-06					0.2		
		Exposure Medium Total								3E-06					0.2		
Air	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	4.1E-6	mg/m³	7.0E-09	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	8E-10	4.9E-07	(mg/m³)	NA	(mg/m³)	--	
				Benzo(a)pyrene	3.5E-6	mg/m³	6.0E-09	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	7E-09	4.2E-07	(mg/m³)	NA	(mg/m³)	--	
				Benzo(b)fluoranthene	5.1E-6	mg/m³	8.7E-09	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1E-09	6.1E-07	(mg/m³)	NA	(mg/m³)	--	
				Benzo(g,h,i)perylene	1.5E-6	mg/m³	2.6E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.8E-07	(mg/m³)	NA	(mg/m³)	--	
				Benzo(k)fluoranthene	1.8E-6	mg/m³	3.1E-09	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	3E-10	2.1E-07	(mg/m³)	NA	(mg/m³)	--	
				Chrysene	4.0E-6	mg/m³	6.8E-09	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	7E-11	4.8E-07	(mg/m³)	NA	(mg/m³)	--	
				Dibenzo(a,h)anthracene	5.9E-7	mg/m³	1.0E-09	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	1E-09	7.0E-08	(mg/m³)	NA	(mg/m³)	--	
				Indeno(1,2,3-cd)pyrene	1.5E-6	mg/m³	2.6E-09	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	3E-10	1.8E-07	(mg/m³)	NA	(mg/m³)	--	
				Total Aroclors	3.0E-7	mg/m³	5.1E-10	(mg/m³)	5.7E-04	(ug/m³) ⁻¹	3E-10	3.6E-08	(mg/m³)	NA	(mg/m³)	--	
				Arsenic	1.6E-5	mg/m³	2.7E-08	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	1E-07	1.9E-06	(mg/m³)	1.5E-05	(mg/m³)	0.1	
				Cobalt	1.6E-5	mg/m³	2.7E-08	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	2E-07	1.9E-06	(mg/m³)	2.0E-05	(mg/m³)	0.1	
				Iron	0.023	mg/m³	3.9E-05	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.7E-03	(mg/m³)	NA	(mg/m³)	--	
				Manganese	4.4E-4	mg/m³	7.5E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	5.2E-05	(mg/m³)	5.0E-05	(mg/m³)	1	
				Exp. Route Total								3E-07					1
				Exposure Point Total								3E-07					1
				Exposure Medium Total								3E-07					1
		Medium Total								3E-06					1		

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.146	mg/kg	3.5E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3E-09	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	4.0E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3E-08	2.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	7.7E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6E-09	5.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	1.1E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	8E-09	7.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	3.9E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.7E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.03	
				Arsenic	35.0	mg/kg	8.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1E-06	5.9E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.2	
				Chromium VI	19.1	mg/kg	4.6E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	2E-07	3.2E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	--	
				Cobalt	18.7	mg/kg	4.5E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01	
				Iron	37,600	mg/kg	9.0E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.3E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.09	
				Manganese	872	mg/kg	2.1E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.5E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.06	
			Exp. Route Total								1E-06					0.4	
			Dermal	Benzo(a)anthracene	0.146	mg/kg	1.4E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1E-09	9.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	1.6E-09	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1E-08	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	3.0E-09	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2E-09	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	4.1E-10	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3E-09	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	35.0	mg/kg	7.6E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1E-07	5.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--	
				Cobalt	18.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--	
				Iron	37,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
		Manganese		872	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--		
		Exp. Route Total								1E-07					0.02		
		Exposure Point Total										1E-06					0.4
		Exposure Medium Total										1E-06					0.4
Air	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.0E-7	mg/m³	1.7E-10	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2E-11	1.2E-08	(mg/m³)	NA	(mg/m³)	--	
				Benzo(a)pyrene	1.2E-7	mg/m³	2.0E-10	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	2E-10	1.4E-08	(mg/m³)	NA	(mg/m³)	--	
				Benzo(b)fluoranthene	2.3E-7	mg/m³	3.9E-10	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	4E-11	2.7E-08	(mg/m³)	NA	(mg/m³)	--	
				Dibenzo(a,h)anthracene	3.1E-8	mg/m³	5.3E-11	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	6E-11	3.7E-09	(mg/m³)	NA	(mg/m³)	--	
				Aluminum	0.012	mg/m³	2.0E-05	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.4E-03	(mg/m³)	5.0E-03	(mg/m³)	0.3	
				Arsenic	2.5E-5	mg/m³	4.3E-08	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	2E-07	3.0E-06	(mg/m³)	1.5E-05	(mg/m³)	0.2	
				Chromium VI	1.4E-5	mg/m³	2.4E-08	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	2E-06	1.7E-06	(mg/m³)	1.0E-04	(mg/m³)	0.02	
				Cobalt	1.3E-5	mg/m³	2.2E-08	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	2E-07	1.5E-06	(mg/m³)	2.0E-05	(mg/m³)	0.08	
				Iron	0.027	mg/m³	4.6E-05	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.2E-03	(mg/m³)	NA	(mg/m³)	--	
				Manganese	6.2E-4	mg/m³	1.1E-06	(mg/m³)	NA	(ug/m³) ⁻¹	--	7.4E-05	(mg/m³)	5.0E-05	(mg/m³)	1	
		Exp. Route Total								2E-06					2		
		Exposure Point Total										2E-06					2
		Exposure Medium Total										2E-06					2
		Medium Total										3E-06					2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	3.4E-05	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.4E-05	7.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	4.92	mg/kg	2.9E-05	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.1E-04	6.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	7.12	mg/kg	4.2E-05	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.0E-05	9.1E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	2.07	mg/kg	2.3E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.6E-05	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.0009	
				Benzo(k)fluoranthene	2.48	mg/kg	1.4E-05	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	1.1E-06	3.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	5.65	mg/kg	3.3E-05	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	2.4E-07	7.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.820	mg/kg	4.8E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.5E-05	1.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	1.2E-05	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.8E-06	2.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.416	mg/kg	4.6E-07	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	9.1E-07	5.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.8	mg/kg	2.4E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.6E-05	2.8E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.9	
				Cobalt	22.7	mg/kg	2.5E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.9E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.0	
				Iron	32,000	mg/kg	3.5E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.1E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.6	
				Manganese	619	mg/kg	6.8E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.9E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.3	
			Exp. Route Total								3.5E-04					2.8	
			Dermal	Benzo(a)anthracene	5.74	mg/kg	1.2E-05	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	8.9E-06	2.7E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	4.92	mg/kg	1.0E-05	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	7.6E-05	2.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	7.12	mg/kg	1.5E-05	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.1E-05	3.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	2.07	mg/kg	8.3E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.6E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.0003	
				Benzo(k)fluoranthene	2.48	mg/kg	5.3E-06	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	3.9E-07	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	5.65	mg/kg	1.2E-05	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	8.8E-08	2.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.820	mg/kg	1.7E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.3E-05	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	4.4E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.2E-06	9.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.416	mg/kg	1.8E-07	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	3.6E-07	2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.8	mg/kg	2.0E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.0E-06	2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08	
				Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	32,000	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								1.2E-04					0.08	
			Exposure Point Total										4.6E-04				2.9
			Exposure Medium Total										4.6E-04				2.9
Air	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	5.2E-10	mg/m³	2.3E-10	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	2.5E-11	5.0E-10	(mg/m³)	NA	(mg/m³)	--	
				Benzo(a)pyrene	4.5E-10	mg/m³	2.0E-10	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	2.2E-10	4.3E-10	(mg/m³)	NA	(mg/m³)	--	
				Benzo(b)fluoranthene	6.5E-10	mg/m³	2.8E-10	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	3.1E-11	6.2E-10	(mg/m³)	NA	(mg/m³)	--	
				Benzo(g,h,i)perylene	1.9E-10	mg/m³	1.5E-11	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.8E-10	(mg/m³)	NA	(mg/m³)	--	
				Benzo(k)fluoranthene	2.3E-10	mg/m³	9.9E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.1E-11	2.2E-10	(mg/m³)	NA	(mg/m³)	--	
				Chrysene	5.1E-10	mg/m³	2.3E-10	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	2.5E-12	4.9E-10	(mg/m³)	NA	(mg/m³)	--	
				Dibenzo(a,h)anthracene	7.5E-11	mg/m³	3.3E-11	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	3.9E-11	7.1E-11	(mg/m³)	NA	(mg/m³)	--	
				Indeno(1,2,3-cd)pyrene	1.9E-10	mg/m³	8.2E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	9.1E-12	1.8E-10	(mg/m³)	NA	(mg/m³)	--	
				Total Aroclors	3.8E-11	mg/m³	3.1E-12	(mg/m³)	5.7E-04	(ug/m³) ⁻¹	1.8E-12	3.6E-11	(mg/m³)	NA	(mg/m³)	--	
				Arsenic	2.0E-9	mg/m³	1.6E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	7.0E-10	1.9E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001	
				Cobalt	2.1E-9	mg/m³	1.7E-10	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	1.5E-09	2.0E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003	
				Iron	2.9E-6	mg/m³	2.4E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.8E-06	(mg/m³)	NA	(mg/m³)	--	
				Manganese	5.6E-8	mg/m³	4.6E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	5.4E-08	(mg/m³)	5.0E-05	(mg/m³)	0.001	
			Exp. Route Total								2.6E-09					0.002	
			Exposure Point Total										2.6E-09				0.002
			Exposure Medium Total										2.6E-09				0.002
			Medium Total										4.6E-04				2.9

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.146	mg/kg	8.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.2E-07	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	9.8E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	7.1E-06	2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	1.9E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.4E-06	4.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	2.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.9E-06	5.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	1.8E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.1E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.2	
				Arsenic	35.0	mg/kg	3.8E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	5.8E-05	4.5E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.5	
				Chromium VI	19.1	mg/kg	1.1E-04	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	5.6E-05	2.4E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.08	
				Cobalt	18.7	mg/kg	2.0E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.4E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.8	
				Iron	37,600	mg/kg	4.1E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.8E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.7	
				Manganese	872	mg/kg	9.6E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.1E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.5	
			Exp. Route Total								1.2E-04					3.7	
			Dermal	Benzo(a)anthracene	0.146	mg/kg	3.1E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.3E-07	6.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	3.6E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.6E-06	7.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	6.9E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	5.0E-07	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	9.4E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	6.8E-07	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	35.0	mg/kg	3.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	4.8E-06	3.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1	
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	18.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	37,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	872	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								8.8E-06					0.1	
			Exposure Point Total										1.3E-04				3.9
			Exposure Medium Total										1.3E-04				3.9
Air	Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.3E-11	mg/m³	5.8E-12	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	6.4E-13	1.3E-11	(mg/m³)	NA	(mg/m³)	--	
				Benzo(a)pyrene	1.5E-11	mg/m³	6.7E-12	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	7.3E-12	1.5E-11	(mg/m³)	NA	(mg/m³)	--	
				Benzo(b)fluoranthene	2.9E-11	mg/m³	1.3E-11	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.4E-12	2.8E-11	(mg/m³)	NA	(mg/m³)	--	
				Dibenzo(a,h)anthracene	4.0E-12	mg/m³	1.8E-12	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	2.1E-12	3.8E-12	(mg/m³)	NA	(mg/m³)	--	
				Aluminum	1.5E-6	mg/m³	1.2E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.4E-06	(mg/m³)	5.0E-03	(mg/m³)	0.0003	
				Arsenic	3.2E-9	mg/m³	2.6E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	1.1E-09	3.1E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0002	
				Chromium VI	1.7E-9	mg/m³	7.6E-10	(mg/m³)	8.4E-02	(ug/m³) ⁻¹	6.4E-08	1.7E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002	
				Cobalt	1.7E-9	mg/m³	1.4E-10	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	1.3E-09	1.6E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003	
				Iron	3.4E-6	mg/m³	2.8E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.3E-06	(mg/m³)	NA	(mg/m³)	--	
				Manganese	7.9E-8	mg/m³	6.5E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	7.6E-08	(mg/m³)	5.0E-05	(mg/m³)	0.002	
			Exp. Route Total								6.6E-08					0.002	
			Exposure Point Total										6.6E-08				0.002
			Exposure Medium Total										6.6E-08				0.002
			Medium Total										1.3E-04				3.9

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	5.74	mg/kg	4.9E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	3.6E-06	7.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	4.92	mg/kg	4.2E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	3.1E-05	6.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	7.12	mg/kg	6.1E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	4.5E-06	9.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	2.07	mg/kg	9.7E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.8E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00009	
				Benzo(k)fluoranthene	2.48	mg/kg	2.1E-06	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	1.6E-07	3.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	5.65	mg/kg	4.9E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	3.6E-08	7.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.820	mg/kg	7.1E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	5.2E-06	1.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Indeno(1,2,3-cd)pyrene	2.07	mg/kg	1.8E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.3E-06	2.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Total Aroclors	0.416	mg/kg	2.0E-07	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	3.9E-07	5.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Arsenic	21.8	mg/kg	1.0E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.5E-05	3.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.10	
				Cobalt	22.7	mg/kg	1.1E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1	
				Iron	32,000	mg/kg	1.5E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06	
				Manganese	619	mg/kg	2.9E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04	
			Exp. Route Total							6.1E-05					0.3		
			Dermal	Benzo(a)anthracene	5.74	mg/kg	2.6E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	1.9E-06	4.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	4.92	mg/kg	2.2E-06	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	1.6E-05	3.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	7.12	mg/kg	3.2E-06	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	2.3E-06	5.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(g,h,i)perylene	2.07	mg/kg	5.0E-07	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.5E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00005	
				Benzo(k)fluoranthene	2.48	mg/kg	1.1E-06	(mg/kg/day)	7.3E-02	(mg/kg/day) ⁻¹	8.1E-08	1.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
				Chrysene	5.65	mg/kg	2.5E-06	(mg/kg/day)	7.3E-03	(mg/kg/day) ⁻¹	1.8E-08	4.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--	
		Dibenzo(a,h)anthracene		0.820	mg/kg	3.7E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ⁻¹	2.7E-06	5.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
		Indeno(1,2,3-cd)pyrene		2.07	mg/kg	9.2E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ⁻¹	6.7E-07	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--		
		Total Aroclors		0.416	mg/kg	1.1E-07	(mg/kg/day)	2.0E+00	(mg/kg/day) ⁻¹	2.2E-07	3.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--		
		Arsenic		21.8	mg/kg	1.2E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.8E-06	3.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01		
		Cobalt	22.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--			
		Iron	32,000	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--			
		Manganese	619	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--			
		Exp. Route Total							2.6E-05					0.01			
		Exposure Point Total								8.7E-05				0.3			
		Exposure Medium Total								8.7E-05				0.3			
Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	5.2E-10	mg/m³	3.1E-10	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	3.5E-11	5.0E-10	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	4.5E-10	mg/m³	2.7E-10	(mg/m³)	1.1E-03	(ug/m³) ⁻¹	3.0E-10	4.3E-10	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	6.5E-10	mg/m³	3.9E-10	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	4.3E-11	6.2E-10	(mg/m³)	NA	(mg/m³)	--		
			Benzo(g,h,i)perylene	1.9E-10	mg/m³	6.2E-11	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.8E-10	(mg/m³)	NA	(mg/m³)	--		
			Benzo(k)fluoranthene	2.3E-10	mg/m³	1.4E-10	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.5E-11	2.2E-10	(mg/m³)	NA	(mg/m³)	--		
			Chrysene	5.1E-10	mg/m³	3.1E-10	(mg/m³)	1.1E-05	(ug/m³) ⁻¹	3.4E-12	4.9E-10	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	7.5E-11	mg/m³	4.5E-11	(mg/m³)	1.2E-03	(ug/m³) ⁻¹	5.4E-11	7.1E-11	(mg/m³)	NA	(mg/m³)	--		
			Indeno(1,2,3-cd)pyrene	1.9E-10	mg/m³	1.1E-10	(mg/m³)	1.1E-04	(ug/m³) ⁻¹	1.2E-11	1.8E-10	(mg/m³)	NA	(mg/m³)	--		
			Total Aroclors	3.8E-11	mg/m³	1.2E-11	(mg/m³)	5.7E-04	(ug/m³) ⁻¹	7.1E-12	3.6E-11	(mg/m³)	NA	(mg/m³)	--		
			Arsenic	2.0E-9	mg/m³	6.5E-10	(mg/m³)	4.3E-03	(ug/m³) ⁻¹	2.8E-09	1.9E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0001		
			Cobalt	2.1E-9	mg/m³	6.8E-10	(mg/m³)	9.0E-03	(ug/m³) ⁻¹	6.1E-09	2.0E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003		
			Iron	2.9E-6	mg/m³	9.6E-07	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.8E-06	(mg/m³)	NA	(mg/m³)	--		
			Manganese	5.6E-8	mg/m³	1.9E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	5.4E-08	(mg/m³)	5.0E-05	(mg/m³)	0.001		
		Exp. Route Total							9.4E-09					0.002			
		Exposure Point Total							9.4E-09					0.002			
		Exposure Medium Total							9.4E-09					0.002			
		Medium Total										8.7E-05			0.3		

TABLE 7.9 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	PCB Removal Area	Ingestion	Benzo(a)anthracene	0.146	mg/kg	1.3E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	9.2E-08	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	1.4E-07	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	1.0E-06	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	2.8E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	2.0E-07	4.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	3.8E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	2.8E-07	6.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	7.6E-03	(mg/kg/day)	NA	(mg/kg/day) ¹	--	2.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02	
				Arsenic	35.0	mg/kg	1.6E-05	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	2.5E-05	4.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.2	
				Chromium VI	19.1	mg/kg	1.6E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ¹	8.2E-06	2.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.009	
				Cobalt	18.7	mg/kg	8.8E-06	(mg/kg/day)	NA	(mg/kg/day) ¹	--	2.6E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.09	
				Iron	37,600	mg/kg	1.8E-02	(mg/kg/day)	NA	(mg/kg/day) ¹	--	5.2E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.07	
				Manganese	872	mg/kg	4.1E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	1.2E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.05	
			Exp. Route Total								3.5E-05					0.4	
			Dermal	Benzo(a)anthracene	0.146	mg/kg	6.5E-08	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	4.8E-08	1.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(a)pyrene	0.167	mg/kg	7.5E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	5.4E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Benzo(b)fluoranthene	0.322	mg/kg	1.4E-07	(mg/kg/day)	7.3E-01	(mg/kg/day) ¹	1.0E-07	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--	
				Dibenzo(a,h)anthracene	0.044	mg/kg	2.0E-08	(mg/kg/day)	7.3E+00	(mg/kg/day) ¹	1.4E-07	3.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--	
				Aluminum	16,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	35.0	mg/kg	2.0E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	3.0E-06	5.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Chromium VI	19.1	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Cobalt	18.7	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--	
				Iron	37,600	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--	
				Manganese	872	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								3.8E-06					0.02	
			Exposure Point Total								3.6E-05					0.4	
			Exposure Medium Total								3.6E-05					0.4	
Air	PCB Removal Area	Inhalation	Benzo(a)anthracene	1.3E-11	mg/m³	8.0E-12	(mg/m³)	1.1E-04	(ug/m³) ¹	8.8E-13	1.3E-11	(mg/m³)	NA	(mg/m³)	--		
			Benzo(a)pyrene	1.5E-11	mg/m³	9.2E-12	(mg/m³)	1.1E-03	(ug/m³) ¹	1.0E-11	1.5E-11	(mg/m³)	NA	(mg/m³)	--		
			Benzo(b)fluoranthene	2.9E-11	mg/m³	1.8E-11	(mg/m³)	1.1E-04	(ug/m³) ¹	1.9E-12	2.8E-11	(mg/m³)	NA	(mg/m³)	--		
			Dibenzo(a,h)anthracene	4.0E-12	mg/m³	2.4E-12	(mg/m³)	1.2E-03	(ug/m³) ¹	2.9E-12	3.8E-12	(mg/m³)	NA	(mg/m³)	--		
			Aluminum	1.5E-6	mg/m³	4.8E-07	(mg/m³)	NA	(ug/m³) ¹	--	1.4E-06	(mg/m³)	5.0E-03	(mg/m³)	0.0003		
			Arsenic	3.2E-9	mg/m³	1.0E-09	(mg/m³)	4.3E-03	(ug/m³) ¹	4.5E-09	3.1E-09	(mg/m³)	1.5E-05	(mg/m³)	0.0002		
			Chromium VI	1.7E-9	mg/m³	1.0E-09	(mg/m³)	8.4E-02	(ug/m³) ¹	8.8E-08	1.7E-09	(mg/m³)	1.0E-04	(mg/m³)	0.00002		
			Cobalt	1.7E-9	mg/m³	5.6E-10	(mg/m³)	9.0E-03	(ug/m³) ¹	5.0E-09	1.6E-09	(mg/m³)	6.0E-06	(mg/m³)	0.0003		
			Iron	3.4E-6	mg/m³	1.1E-06	(mg/m³)	NA	(ug/m³) ¹	--	3.3E-06	(mg/m³)	NA	(mg/m³)	--		
			Manganese	7.9E-8	mg/m³	2.6E-08	(mg/m³)	NA	(ug/m³) ¹	--	7.6E-08	(mg/m³)	5.0E-05	(mg/m³)	0.002		
			Exp. Route Total								9.7E-08					0.002	
			Exposure Point Total								9.7E-08					0.002	
			Exposure Medium Total								9.7E-08					0.002	
			Medium Total								3.8E-05					0.4	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

RAGS Part D Table 9

Summary of Receptor Risks and Hazards for COPCs

North Waterfront

LIST OF TABLES
RAGS PART D TABLE 9 - NORTH WATERFRONT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

9.1.RME	Current Adolescent Trespassers - North Waterfront
9.2.RME	Current Adult Trespassers - North Waterfront
9.3.RME	Current Lifelong Trespassers - North Waterfront
9.4.RME	Current Industrial Workers - North Waterfront
9.5.RME	Future Adolescent Trespassers - North Waterfront
9.6.RME	Future Adult Trespassers - North Waterfront
9.7.RME	Future Lifelong Trespassers - North Waterfront
9.8.RME	Future Industrial Workers - North Waterfront
9.9.RME	Current/Future Construction Workers - North Waterfront
9.10.RME	Hypothetical Child Residents - North Waterfront
9.11.RME	Hypothetical Adult Residents - North Waterfront
9.12.RME	Hypothetical Lifelong Residents - North Waterfront

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	2E-08	--	5E-08	--	7E-08	NA	--	--	--	--
			Benzo(a)pyrene	1E-07	--	4E-07	--	5E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	2E-08	--	6E-08	--	8E-08	NA	--	--	--	--
			Chrysene	2E-10	--	6E-10	--	8E-10	NA	--	--	--	--
			Dibenzo(a,h)anthracene	1E-07	--	3E-07	--	4E-07	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8E-09	--	2E-08	--	3E-08	NA	--	--	--	--
			Chromium VI	6E-07	--	--	--	6E-07	None Specified	0.0009	--	--	0.0009
			Cobalt	--	--	--	--	--	Thyroid	0.006	--	--	0.006
			Iron	--	--	--	--	--	GS	0.007	--	--	0.007
			Manganese	--	--	--	--	--	CNS	0.003	--	--	0.003
			Chemical Total	9E-07	--	8E-07	--	2E-06		0.02	--	--	0.02
		Exposure Point Total						2E-06					0.02
		Exposure Medium Total						2E-06					0.02
	Air	North Waterfront	Benzo(a)anthracene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Benzo(a)pyrene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Benzo(b)fluoranthene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Chrysene	--	2E-15	--	--	2E-15	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	9E-15	--	--	9E-15	NA	--	--	--	--
			Chromium VI	--	8E-10	--	--	8E-10	Respiratory	--	0.0000002	--	0.0000002
			Cobalt	--	2E-11	--	--	2E-11	Respiratory	--	0.000002	--	0.000002
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.000009	--	0.000009
			Chemical Total	--	8E-10	--	--	8E-10		--	0.00001	--	0.00001
		Exposure Point Total						8E-10					0.00001
		Exposure Medium Total						8E-10					0.00001
Medium Total								2E-06					0.02
Receptor Total								2E-06					0.02
Receptor Risk Total									Receptor HI Total				0.02

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient							
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total			
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	9E-09	--	5E-09	--	1E-08	NA	--	--	--	--			
			Benzo(a)pyrene	6E-08	--	3E-08	--	1E-07	NA	--	--	--	--			
			Benzo(b)fluoranthene	1E-08	--	5E-09	--	2E-08	NA	--	--	--	--			
			Chrysene	9E-11	--	5E-11	--	1E-10	NA	--	--	--	--			
			Dibenzo(a,h)anthracene	5E-08	--	3E-08	--	7E-08	NA	--	--	--	--			
			Indeno(1,2,3-cd)pyrene	4E-09	--	2E-09	--	6E-09	NA	--	--	--	--			
			Chromium VI	3E-07	--	--	--	3E-07	None Specified	0.0007	--	--	0.0007			
			Cobalt	--	--	--	--	--	Thyroid	0.004	--	--	0.004			
			Iron	--	--	--	--	--	GS	0.005	--	--	0.005			
			Manganese	--	--	--	--	--	CNS	0.002	--	--	0.002			
			Chemical Total	4E-07	--	7E-08	--	5E-07		0.01	--	--	0.01			
		Exposure Point Total							0.01							
		Exposure Medium Total							0.01							
		Air	North Waterfront	Benzo(a)anthracene	--	1E-14	--	--	1E-14	NA	--	--	--	--		
	Benzo(a)pyrene			--	1E-13	--	--	1E-13	NA	--	--	--	--			
	Benzo(b)fluoranthene			--	2E-14	--	--	2E-14	NA	--	--	--	--			
	Chrysene			--	1E-15	--	--	1E-15	NA	--	--	--	--			
	Dibenzo(a,h)anthracene			--	8E-14	--	--	8E-14	NA	--	--	--	--			
	Indeno(1,2,3-cd)pyrene			--	6E-15	--	--	6E-15	NA	--	--	--	--			
	Chromium VI			--	5E-10	--	--	5E-10	Respiratory	--	0.0000002	--	0.0000002			
	Cobalt			--	4E-11	--	--	4E-11	Respiratory	--	0.000002	--	0.000002			
	Iron			--	--	--	--	--	NA	--	--	--	--			
	Manganese			--	--	--	--	--	CNS	--	0.000009	--	0.000009			
	Chemical Total			--	6E-10	--	--	6E-10		--	0.00001	--	0.00001			
	Exposure Point Total								0.00001							
	Exposure Medium Total								0.00001							
										0.01						
	Medium Total															
	Receptor Total			Receptor Risk Total						Receptor HI Total						

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	ingestion	inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	3E-08	--	6E-08	--	9E-08					
			Benzo(a)pyrene	2E-07	--	4E-07	--	6E-07					
			Benzo(b)fluoranthene	3E-08	--	7E-08	--	1E-07					
			Chrysene	3E-10	--	6E-10	--	9E-10					
			Dibenzo(a,h)anthracene	2E-07	--	3E-07	--	5E-07					
			Indeno(1,2,3-cd)pyrene	1E-08	--	3E-08	--	4E-08					
			Chromium VI	9E-07	--	--	--	9E-07					
			Cobalt	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Chemical Total	1E-06	--	9E-07	--	2E-06					
		Exposure Point Total						2E-06					
		Exposure Medium Total						2E-06					
	Air	North Waterfront	Benzo(a)anthracene	--	4E-14	--	--	4E-14					
			Benzo(a)pyrene	--	3E-13	--	--	3E-13					
			Benzo(b)fluoranthene	--	4E-14	--	--	4E-14					
			Chrysene	--	4E-15	--	--	4E-15					
			Dibenzo(a,h)anthracene	--	2E-13	--	--	2E-13					
			Indeno(1,2,3-cd)pyrene	--	2E-14	--	--	2E-14					
			Chromium VI	--	1E-09	--	--	1E-09					
			Cobalt	--	5E-11	--	--	5E-11					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Chemical Total	--	1E-09	--	--	1E-09					
		Exposure Point Total						1E-09					
		Exposure Medium Total						1E-09					
Medium Total								2E-06					
Receptor Total								2E-06					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	6E-08	--	5E-08	--	1E-07	NA	--	--	--	--	
			Benzo(a)pyrene	4E-07	--	4E-07	--	8E-07	NA	--	--	--	--	
			Benzo(b)fluoranthene	7E-08	--	6E-08	--	1E-07	NA	--	--	--	--	
			Chrysene	6E-10	--	5E-10	--	1E-09	NA	--	--	--	--	
			Dibenzo(a,h)anthracene	3E-07	--	3E-07	--	6E-07	NA	--	--	--	--	
			Indeno(1,2,3-cd)pyrene	3E-08	--	2E-08	--	5E-08	NA	--	--	--	--	
			Chromium VI	2E-06	--	--	--	2E-06	None Specified	0.004	--	--	0.004	
			Cobalt	--	--	--	--	--	Thyroid	0.02	--	--	0.02	
			Iron	--	--	--	--	--	GS	0.03	--	--	0.03	
			Manganese	--	--	--	--	--	CNS	0.009	--	--	0.009	
			Chemical Total	3E-06	--	8E-07	--	4E-06		0.06	--	--	0.06	
		Exposure Point Total												0.06
		Exposure Medium Total												0.06
	Air	North Waterfront	Benzo(a)anthracene	--	2E-13	--	--	2E-13	NA	--	--	--	--	
			Benzo(a)pyrene	--	1E-12	--	--	1E-12	NA	--	--	--	--	
			Benzo(b)fluoranthene	--	2E-13	--	--	2E-13	NA	--	--	--	--	
			Chrysene	--	2E-14	--	--	2E-14	NA	--	--	--	--	
			Dibenzo(a,h)anthracene	--	1E-12	--	--	1E-12	NA	--	--	--	--	
			Indeno(1,2,3-cd)pyrene	--	8E-14	--	--	8E-14	NA	--	--	--	--	
			Chromium VI	--	7E-09	--	--	7E-09	Respiratory	--	0.000002	--	0.000002	
			Cobalt	--	5E-10	--	--	5E-10	Respiratory	--	0.00002	--	0.00002	
			Iron	--	--	--	--	--	NA	--	--	--	--	
			Manganese	--	--	--	--	--	CNS	--	0.00010	--	0.00010	
			Chemical Total	--	7E-09	--	--	7E-09		--	0.0001	--	0.0001	
		Exposure Point Total												0.0001
		Exposure Medium Total												0.0001
Medium Total												0.06		
Receptor Total												0.06		
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												0.06		
												0.06		
												0.06		
												0.06		
												0.06		
		</												

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	2E-08	--	5E-08	--	7E-08	NA	--	--	--	--
			Benzo(a)pyrene	1E-07	--	4E-07	--	5E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	2E-08	--	6E-08	--	8E-08	NA	--	--	--	--
			Chrysene	2E-10	--	5E-10	--	7E-10	NA	--	--	--	--
			Dibenzo(a,h)anthracene	1E-07	--	3E-07	--	4E-07	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	9E-09	--	3E-08	--	3E-08	NA	--	--	--	--
			Chromium VI	8E-07	--	--	--	8E-07	None Specified	0.001	--	--	0.001
			Cobalt	--	--	--	--	--	Thyroid	0.007	--	--	0.007
			Iron	--	--	--	--	--	GS	0.007	--	--	0.007
			Chemical Total	1E-06	--	8E-07	--	2E-06		0.01	--	--	0.01
		Exposure Point Total					2E-06					0.01	
		Exposure Medium Total					2E-06					0.01	
	Air	North Waterfront	Benzo(a)anthracene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Benzo(a)pyrene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Benzo(b)fluoranthene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Chrysene	--	2E-15	--	--	2E-15	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	1E-14	--	--	1E-14	NA	--	--	--	--
			Chromium VI	--	1E-09	--	--	1E-09	Respiratory	--	0.0000003	--	0.0000003
			Cobalt	--	2E-11	--	--	2E-11	Respiratory	--	0.000003	--	0.000003
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	1E-09	--	--	1E-09		--	0.000003	--	0.000003
		Exposure Point Total					1E-09					0.000003	
		Exposure Medium Total					1E-09					0.000003	
Medium Total								2E-06				0.01	
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	4E-08	--	1E-07	--	1E-07	NA	--	--	--	--
			Dibenzo(a,h)anthracene	2E-08	--	5E-08	--	7E-08	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.002	--	--	0.002
			Chromium VI	6E-07	--	--	--	6E-07	None Specified	0.0010	--	--	0.0010
			Cobalt	--	--	--	--	--	Thyroid	0.008	--	--	0.008
			Iron	--	--	--	--	--	GS	0.008	--	--	0.008
			Chemical Total	7E-07	--	2E-07	--	8E-07		0.02	--	--	0.02
		Exposure Point Total					8E-07					0.02	
		Exposure Medium Total					8E-07					0.02	
	Air	North Waterfront	Benzo(a)pyrene	--	4E-14	--	--	4E-14	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.000003	--	0.000003
			Chromium VI	--	8E-10	--	--	8E-10	Respiratory	--	0.0000002	--	0.0000002
			Cobalt	--	2E-11	--	--	2E-11	Respiratory	--	0.000003	--	0.000003
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	8E-10	--	--	8E-10		--	0.000006	--	0.000006
		Exposure Point Total					8E-10					0.000006	
		Exposure Medium Total					8E-10					0.000006	
Medium Total								8E-07				0.02	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	8E-09	--	4E-09	--	1E-08	NA	--	--	--	--
			Benzo(a)pyrene	6E-08	--	3E-08	--	1E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	1E-08	--	5E-09	--	1E-08	NA	--	--	--	--
			Chrysene	8E-11	--	4E-11	--	1E-10	NA	--	--	--	--
			Dibenzo(a,h)anthracene	5E-08	--	3E-08	--	7E-08	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	4E-09	--	2E-09	--	6E-09	NA	--	--	--	--
			Chromium VI	4E-07	--	--	--	4E-07	None Specified	0.0008	--	--	0.0008
			Cobalt	--	--	--	--	--	Thyroid	0.005	--	--	0.005
			Iron	--	--	--	--	--	GS	0.005	--	--	0.005
			Chemical Total	5E-07	--	7E-08	--	6E-07		0.01	--	--	0.01
		Exposure Point Total					6E-07					0.01	
		Exposure Medium Total					6E-07					0.01	
	Air	North Waterfront	Benzo(a)anthracene	--	1E-14	--	--	1E-14	NA	--	--	--	--
			Benzo(a)pyrene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Benzo(b)fluoranthene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Chrysene	--	1E-15	--	--	1E-15	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	8E-14	--	--	8E-14	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	7E-15	--	--	7E-15	NA	--	--	--	--
			Chromium VI	--	6E-10	--	--	6E-10	Respiratory	--	0.0000003	--	0.0000003
			Cobalt	--	4E-11	--	--	4E-11	Respiratory	--	0.000003	--	0.000003
Iron	--	--	--	--	--	NA	--	--	--	--			
Chemical Total	--	7E-10	--	--	7E-10		--	0.000003	--	0.000003			
Exposure Point Total					7E-10					0.000003			
Exposure Medium Total					7E-10					0.000003			
Medium Total					6E-07					0.01			
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	2E-08	--	9E-09	--	3E-08	NA	--	--	--	--
			Dibenzo(a,h)anthracene	9E-09	--	5E-09	--	1E-08	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.001	--	--	0.001
			Chromium VI	3E-07	--	--	--	3E-07	None Specified	0.0007	--	--	0.0007
			Cobalt	--	--	--	--	--	Thyroid	0.005	--	--	0.005
			Iron	--	--	--	--	--	GS	0.005	--	--	0.005
			Chemical Total	3E-07	--	1E-08	--	3E-07		0.01	--	--	0.01
		Exposure Point Total					3E-07					0.01	
	Exposure Medium Total					3E-07					0.01		
	Air	North Waterfront	Benzo(a)pyrene	--	3E-14	--	--	3E-14	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.000003	--	0.000003
			Chromium VI	--	5E-10	--	--	5E-10	Respiratory	--	0.0000002	--	0.0000002
			Cobalt	--	4E-11	--	--	4E-11	Respiratory	--	0.000003	--	0.000003
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	6E-10	--	--	6E-10		--	0.000006	--	0.000006
Exposure Point Total							6E-10					0.000006	
Exposure Medium Total					6E-10					0.000006			
Medium Total					3E-07					0.01			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient								
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total				
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	3E-08	--	5E-08	--	8E-08									
			Benzo(a)pyrene	2E-07	--	4E-07	--	6E-07									
			Benzo(b)fluoranthene	3E-08	--	6E-08	--	9E-08									
			Chrysene	3E-10	--	5E-10	--	8E-10									
			Dibenzo(a,h)anthracene	2E-07	--	3E-07	--	5E-07									
			Indeno(1,2,3-cd)pyrene	1E-08	--	3E-08	--	4E-08									
			Chromium VI	1E-06	--	--	--	1E-06									
			Cobalt	--	--	--	--	--									
			Iron	--	--	--	--	--									
			Chemical Total	2E-06	--	9E-07	--	2E-06									
		Exposure Point Total						2E-06									
		Exposure Medium Total						2E-06									
	Air	North Waterfront	Benzo(a)anthracene	--	3E-14	--	--	3E-14									
			Benzo(a)pyrene	--	3E-13	--	--	3E-13									
			Benzo(b)fluoranthene	--	4E-14	--	--	4E-14									
			Chrysene	--	3E-15	--	--	3E-15									
			Dibenzo(a,h)anthracene	--	2E-13	--	--	2E-13									
			Indeno(1,2,3-cd)pyrene	--	2E-14	--	--	2E-14									
			Chromium VI	--	2E-09	--	--	2E-09									
			Cobalt	--	6E-11	--	--	6E-11									
			Iron	--	--	--	--	--									
			Chemical Total	--	2E-09	--	--	2E-09									
		Exposure Point Total						2E-09									
		Exposure Medium Total						2E-09									
Medium Total									2E-06								
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	5E-08	--	1E-07	--	2E-07									
			Dibenzo(a,h)anthracene	3E-08	--	6E-08	--	9E-08									
			Aluminum	--	--	--	--	--									
			Chromium VI	9E-07	--	--	--	9E-07									
			Cobalt	--	--	--	--	--									
			Iron	--	--	--	--	--									
			Chemical Total	1E-06	--	2E-07	--	1E-06									
		Exposure Point Total						1E-06									
		Exposure Medium Total						1E-06									
	Air	North Waterfront	Benzo(a)pyrene	--	7E-14	--	--	7E-14									
			Dibenzo(a,h)anthracene	--	4E-14	--	--	4E-14									
			Aluminum	--	--	--	--	--									
			Chromium VI	--	1E-09	--	--	1E-09									
			Cobalt	--	7E-11	--	--	7E-11									
			Iron	--	--	--	--	--									
			Chemical Total	--	1E-09	--	--	1E-09									
		Exposure Point Total						1E-09									
		Exposure Medium Total						1E-09									
Medium Total									1E-06								

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	5E-08	--	5E-08	--	1E-07	NA	--	--	--	--		
			Benzo(a)pyrene	4E-07	--	4E-07	--	8E-07	NA	--	--	--	--		
			Benzo(b)fluoranthene	6E-08	--	5E-08	--	1E-07	NA	--	--	--	--		
			Chrysene	5E-10	--	5E-10	--	1E-09	NA	--	--	--	--		
			Dibenzo(a,h)anthracene	3E-07	--	3E-07	--	6E-07	NA	--	--	--	--		
			Indeno(1,2,3-cd)pyrene	3E-08	--	2E-08	--	5E-08	NA	--	--	--	--		
			Chromium VI	2E-06	--	--	--	2E-06	None Specified	0.004	--	--	0.004		
			Cobalt	--	--	--	--	--	Thyroid	0.03	--	--	0.03		
			Iron	--	--	--	--	--	GS	0.02	--	--	0.02		
			Chemical Total	3E-06	--	7E-07	--	4E-06		0.05	--	--	0.05		
		Exposure Point Total						4E-06						0.05	
		Exposure Medium Total						4E-06						0.05	
	Air	North Waterfront	Benzo(a)anthracene	--	2E-13	--	--	2E-13	NA	--	--	--	--		
			Benzo(a)pyrene	--	1E-12	--	--	1E-12	NA	--	--	--	--		
			Benzo(b)fluoranthene	--	2E-13	--	--	2E-13	NA	--	--	--	--		
			Chrysene	--	2E-14	--	--	2E-14	NA	--	--	--	--		
			Dibenzo(a,h)anthracene	--	1E-12	--	--	1E-12	NA	--	--	--	--		
			Indeno(1,2,3-cd)pyrene	--	9E-14	--	--	9E-14	NA	--	--	--	--		
			Chromium VI	--	8E-09	--	--	8E-09	Respiratory	--	0.000003	--	0.000003		
			Cobalt	--	5E-10	--	--	5E-10	Respiratory	--	0.00003	--	0.00003		
			Iron	--	--	--	--	--	NA	--	--	--	--		
			Chemical Total	--	9E-09	--	--	9E-09		--	0.00003	--	0.00003		
		Exposure Point Total						9E-09						0.00003	
		Exposure Medium Total						9E-09						0.00003	
		Medium Total						4E-06						0.05	
		Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	1E-07	--	1E-07	--	2E-07	NA	--	--	--	--
					Dibenzo(a,h)anthracene	6E-08	--	5E-08	--	1E-07	NA	--	--	--	--
Aluminum	--				--	--	--	--	CNS	0.007	--	--	0.007		
Chromium VI	2E-06				--	--	--	2E-06	None Specified	0.004	--	--	0.004		
Cobalt	--				--	--	--	--	Thyroid	0.03	--	--	0.03		
Iron	--			--	--	--	--	GS	0.03	--	--	0.03			
Chemical Total	2E-06			--	1E-07	--	2E-06		0.07	--	--	0.07			
Exposure Point Total						2E-06						0.07			
Exposure Medium Total						2E-06						0.07			
Air	North Waterfront		Benzo(a)pyrene	--	4E-13	--	--	4E-13	NA	--	--	--	--		
			Dibenzo(a,h)anthracene	--	2E-13	--	--	2E-13	NA	--	--	--	--		
			Aluminum	--	--	--	--	--	CNS	--	0.00003	--	0.00003		
		Chromium VI	--	7E-09	--	--	7E-09	Respiratory	--	0.000002	--	0.000002			
		Cobalt	--	6E-10	--	--	6E-10	Respiratory	--	0.00003	--	0.00003			
Iron	--	--	--	--	--	NA	--	--	--	--					
Chemical Total	--	7E-09	--	--	7E-09		--	0.00006	--	0.00006					
Exposure Point Total						7E-09						0.00006			
Exposure Medium Total						7E-09						0.00006			
Medium Total						2E-06						0.07			

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Groundwater	Groundwater	North Waterfront	cis-1,2-Dichloroethene	--	--	--	--	--	Kidney	0.02	--	0.0002	0.02		
			Trichloroethene	2E-06	--	3E-08	--	2E-06	Immune System, Developmental	0.2	--	0.004	0.2		
			Vinyl Chloride	4E-06	--	2E-08	--	4E-06	Liver	0.005	--	0.00002	0.005		
			Aluminum	--	--	--	--	--	CNS	0.003	--	0.000001	0.003		
			Chromium VI	9E-07	--	3E-08	--	9E-07	None Specified	0.002	--	0.00006	0.002		
			Iron	--	--	--	--	--	GS	0.008	--	0.000004	0.008		
			Manganese	--	--	--	--	--	CNS	0.02	--	0.0002	0.02		
			Chemical Total	7E-06	--	8E-08	--	7E-06		0.3	--	0.004	0.3		
		Exposure Point Total					7E-06					0.3			
	Exposure Medium Total					7E-06					0.3				
Medium Total					7E-06					0.3					
Receptor Total				Total Cancer Risks for Surface Soil and Groundwater					1E-05	Total Hazard Indices for Surface Soil and Groundwater					0.4
Receptor Total				Total Cancer Risks for Subsurface Soil and Groundwater					9E-06	Total Hazard Indices for Subsurface Soil and Groundwater					0.4

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DEREKTOK SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	4E-09	--	1E-09	--	5E-09	NA	--	--	--	--
			Benzo(a)pyrene	3E-08	--	1E-08	--	4E-08	NA	--	--	--	--
			Benzo(b)fluoranthene	4E-09	--	2E-09	--	6E-09	NA	--	--	--	--
			Chrysene	4E-11	--	1E-11	--	5E-11	NA	--	--	--	--
			Dibenzo(a,h)anthracene	2E-08	--	8E-09	--	3E-08	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2E-09	--	7E-10	--	3E-09	NA	--	--	--	--
			Chromium VI	2E-07	--	--	--	2E-07	None Specified	0.001	--	--	0.001
			Cobalt	--	--	--	--	--	Thyroid	0.004	--	--	0.004
			Iron	--	--	--	--	--	GS	0.04	--	--	0.04
			Chemical Total	2E-07	--	2E-08	--	2E-07		0.05	--	--	0.05
		Exposure Point Total						2E-07					0.05
		Exposure Medium Total						2E-07					0.05
	Air	North Waterfront	Benzo(a)anthracene	--	3E-11	--	--	3E-11	NA	--	--	--	--
			Benzo(a)pyrene	--	2E-10	--	--	2E-10	NA	--	--	--	--
			Benzo(b)fluoranthene	--	3E-11	--	--	3E-11	NA	--	--	--	--
			Chrysene	--	3E-12	--	--	3E-12	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	2E-10	--	--	2E-10	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	1E-11	--	--	1E-11	NA	--	--	--	--
			Chromium VI	--	1E-06	--	--	1E-06	Respiratory	--	0.01	--	0.01
Subsurface Soil	Subsurface Soil	North Waterfront	Cobalt	--	9E-08	--	--	9E-08	Respiratory	--	0.03	--	0.03
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	1E-06	--	--	1E-06		--	0.04	--	0.04
		Exposure Point Total						1E-06					0.04
		Exposure Medium Total						1E-06					0.04
		Medium Total						2E-06					0.09
	Subsurface Soil	North Waterfront	Benzo(a)pyrene	8E-09	--	3E-09	--	1E-08	NA	--	--	--	--
			Dibenzo(a,h)anthracene	4E-09	--	2E-09	--	6E-09	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.01	--	--	0.01
			Chromium VI	1E-07	--	--	--	1E-07	None Specified	0.0009	--	--	0.0009
			Cobalt	--	--	--	--	--	Thyroid	0.005	--	--	0.005
			Iron	--	--	--	--	--	GS	0.05	--	--	0.05
			Chemical Total	1E-07	--	5E-09	--	1E-07		0.07	--	--	0.07
		Exposure Point Total						1E-07					0.07
		Exposure Medium Total						1E-07					0.07
	Air	North Waterfront	Benzo(a)pyrene	--	6E-11	--	--	6E-11	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	3E-11	--	--	3E-11	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.1	--	0.1
			Chromium VI	--	1E-06	--	--	1E-06	Respiratory	--	0.009	--	0.009
			Cobalt	--	9E-08	--	--	9E-08	Respiratory	--	0.04	--	0.04
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	1E-06	--	--	1E-06		--	0.2	--	0.2
		Exposure Point Total						1E-06					0.2
		Exposure Medium Total						1E-06					0.2
		Medium Total						1E-06					0.2

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Groundwater	Groundwater	North Waterfront	cis-1,2-Dichloroethene	--	--	--	--	--	Kidney	0.00005	--	0.0003	0.0004	
			Trichloroethene	2E-09	--	1E-08	--	2E-08	Liver, Kidney	0.006	--	0.04	0.05	
			Vinyl Chloride	4E-09	--	1E-08	--	2E-08	Liver	0.001	--	0.004	0.005	
			Aluminum	--	--	--	--	--	CNS	0.00009	--	0.00005	0.0001	
			Chromium VI	9E-10	--	4E-08	--	4E-08	None Specified	0.000006	--	0.0003	0.0003	
			Iron	--	--	--	--	--	GS	0.0002	--	0.0001	0.0003	
			Manganese	--	--	--	--	--	CNS	0.0006	--	0.008	0.008	
			Chemical Total	7E-09	--	6E-08	--	7E-08		0.008	--	0.05	0.06	
			Exposure Point Total					7E-08					0.06	
			Exposure Medium Total					7E-08					0.06	
	Air	North Waterfront	cis-1,2-Dichloroethene	--	--	--	--	--	NA	--	--	--	--	
			Trichloroethene	--	3E-09	--	--	3E-09	Liver, Kidney	--	0.00009	--	0.00009	
			Vinyl Chloride	--	5E-10	--	--	5E-10	Liver	--	0.0001	--	0.0001	
			Aluminum	--	--	--	--	--	CNS	--	--	--	--	
			Chromium VI	--	--	--	--	--	Respiratory	--	--	--	--	
			Iron	--	--	--	--	--	NA	--	--	--	--	
			Manganese	--	--	--	--	--	CNS	--	--	--	--	
			Chemical Total	--	3E-09	--	--	3E-09		--	0.0002	--	0.0002	
			Exposure Point Total					3E-09					0.0002	
			Exposure Medium Total					3E-09					0.0002	
Medium Total								7E-08				0.06		
Receptor Total				Total Cancer Risks for Surface Soil and Groundwater					Total Hazard Indices for Surface Soil and Groundwater					0.2
Receptor Total				Total Cancer Risks for Subsurface Soil and Groundwater					Total Hazard Indices for Subsurface Soil and Groundwater					0.3

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	9E-07	--	3E-07	--	1E-06	NA	--	--	--	--
			Benzo(a)pyrene	7E-06	--	3E-06	--	9E-06	NA	--	--	--	--
			Benzo(b)fluoranthene	1E-06	--	4E-07	--	1E-06	NA	--	--	--	--
			Chrysene	9E-09	--	3E-09	--	1E-08	NA	--	--	--	--
			Dibenzo(a,h)anthracene	5E-06	--	2E-06	--	7E-06	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	5E-07	--	2E-07	--	6E-07	NA	--	--	--	--
			Chromium VI	4E-05	--	--	--	4E-05	None Specified	0.06	--	--	0.06
			Cobalt	--	--	--	--	--	Thyroid	0.3	--	--	0.3
			Iron	--	--	--	--	--	GS	0.3	--	--	0.3
			Chemical Total	5E-05	--	5E-06	--	6E-05		0.7	--	--	0.7
		Exposure Point Total						6E-05					0.7
		Exposure Medium Total						6E-05					0.7
	Air	North Waterfront	Benzo(a)anthracene	--	9E-13	--	--	9E-13	NA	--	--	--	--
			Benzo(a)pyrene	--	7E-12	--	--	7E-12	NA	--	--	--	--
			Benzo(b)fluoranthene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Chrysene	--	9E-14	--	--	9E-14	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	6E-12	--	--	6E-12	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	5E-13	--	--	5E-13	NA	--	--	--	--
Subsurface Soil	Subsurface Soil	North Waterfront	Chromium VI	--	5E-08	--	--	5E-08	Respiratory	--	0.00001	--	0.00001
			Cobalt	--	5E-10	--	--	5E-10	Respiratory	--	0.0001	--	0.0001
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	5E-08	--	--	5E-08		--	0.0001	--	0.0001
		Exposure Point Total						5E-08					0.0001
		Exposure Medium Total						5E-08					0.0001
		Medium Total						6E-05					0.7
	Subsurface Soil	North Waterfront	Benzo(a)pyrene	2E-06	--	7E-07	--	3E-06	NA	--	--	--	--
			Dibenzo(a,h)anthracene	1E-06	--	4E-07	--	1E-06	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.10	--	--	0.10
			Chromium VI	3E-05	--	--	--	3E-05	None Specified	0.05	--	--	0.05
			Cobalt	--	--	--	--	--	Thyroid	0.4	--	--	0.4
			Iron	--	--	--	--	--	GS	0.4	--	--	0.4
			Chemical Total	4E-05	--	1E-06	--	4E-05		0.9	--	--	0.9
		Exposure Point Total						4E-05					0.9
		Exposure Medium Total						4E-05					0.9
		Medium Total						4E-05					0.9
	Air	North Waterfront	Benzo(a)pyrene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.0001	--	0.0001
			Chromium VI	--	4E-08	--	--	4E-08	Respiratory	--	0.000010	--	0.000010
			Cobalt	--	6E-10	--	--	6E-10	Respiratory	--	0.0001	--	0.0001
			Iron	--	--	--	--	--	NA	--	--	--	--
		Chemical Total		--	4E-08	--	--	4E-08		--	0.0003	--	0.0003
		Exposure Point Total						4E-08					0.0003
		Exposure Medium Total						4E-08					0.0003
		Medium Total						4E-05					0.9

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	North Waterfront	cis-1,2-Dichloroethene	--	--	--	--	--	Kidney	0.1	--	0.02	0.2
			Trichloroethene (Mutagenic)	3E-06	--	5E-07	--	4E-06	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	2E-06	--	4E-07	--	3E-06	Immune System, Developmental	2	--	0.3	2
			Vinyl Chloride	8E-05	--	4E-06	--	8E-05	Liver	0.03	--	0.002	0.03
			Aluminum	--	--	--	--	--	CNS	0.02	--	0.0001	0.02
			Chromium VI	7E-06	--	4E-06	--	1E-05	None Specified	0.01	--	0.006	0.02
			Iron	--	--	--	--	--	GS	0.06	--	0.0004	0.06
			Manganese	--	--	--	--	--	CNS	0.1	--	0.02	0.2
			Chemical Total	9E-05	--	9E-06	--	1E-04		2	--	0.3	2
		Exposure Point Total											
	Exposure Medium Total												2
	Air	North Waterfront	cis-1,2-Dichloroethene	--	--	--	--	--	NA	--	--	--	--
			Trichloroethene (Mutagenic)	--	3E-06	--	--	3E-06	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	--	2E-06	--	--	2E-06	Liver, Kidney	--	3	--	3
			Vinyl Chloride	--	3E-06	--	--	3E-06	Liver	--	0.007	--	0.007
			Aluminum	--	--	--	--	--	CNS	--	--	--	--
			Chromium VI	--	--	--	--	--	Respiratory	--	--	--	--
Iron			--	--	--	--	--	NA	--	--	--	--	
Manganese			--	--	--	--	--	CNS	--	--	--	--	
Chemical Total		--	8E-06	--	--	8E-06		--	3	--	3		
Exposure Point Total												3	
Exposure Medium Total												3	
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Exposure Medium Total													

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organs - Surface Soil and Groundwater	
Total CNS HI	0.2
Total Developmental HI	2
Total GS HI	0.4
Total Kidney HI	3
Total Liver HI	3
Total Respiratory HI	0.0001
Total None Specified HI	0.07
Total Thyroid HI	0.3

Target Organs - Subsurface Soil and Groundwater	
Total CNS HI	0.3
Total Developmental HI	2
Total GS HI	0.4
Total Kidney HI	3
Total Liver HI	3
Total Respiratory HI	0.0001
Total None Specified HI	0.06
Total Thyroid HI	0.4

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DEREKTOCK SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	1E-07	--	7E-08	--	2E-07	NA	--	--	--	--
			Benzo(a)pyrene	1E-06	--	5E-07	--	2E-06	NA	--	--	--	--
			Benzo(b)fluoranthene	2E-07	--	8E-08	--	2E-07	NA	--	--	--	--
			Chrysene	1E-09	--	7E-10	--	2E-09	NA	--	--	--	--
			Dibenzo(a,h)anthracene	8E-07	--	4E-07	--	1E-06	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	7E-08	--	4E-08	--	1E-07	NA	--	--	--	--
			Chromium VI	6E-06	--	--	--	6E-06	None Specified	0.006	--	--	0.006
			Cobalt	--	--	--	--	--	Thyroid	0.04	--	--	0.04
			Iron	--	--	--	--	--	GS	0.03	--	--	0.03
			Chemical Total	8E-06	--	1E-06	--	9E-06		0.08	--	--	0.08
		Exposure Point Total					9E-06					0.08	
		Exposure Medium Total					9E-06					0.08	
	Air	North Waterfront	Benzo(a)anthracene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Benzo(a)pyrene	--	1E-11	--	--	1E-11	NA	--	--	--	--
			Benzo(b)fluoranthene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Chrysene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	8E-12	--	--	8E-12	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	7E-13	--	--	7E-13	NA	--	--	--	--
			Chromium VI	--	6E-08	--	--	6E-08	Respiratory	--	0.00001	--	0.00001
		Cobalt	--	2E-09	--	--	2E-09	Respiratory	--	0.0001	--	0.0001	
Iron	--	--	--	--	--	NA	--	--	--	--			
Chemical Total	--	6E-08	--	--	6E-08		--	0.0001	--	0.0001			
Exposure Point Total					6E-08					0.0001			
Exposure Medium Total					6E-08					0.0001			
Medium Total					9E-06					0.08			
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	3E-07	--	1E-07	--	4E-07	NA	--	--	--	--
			Dibenzo(a,h)anthracene	1E-07	--	8E-08	--	2E-07	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.01	--	--	0.01
			Chromium VI	5E-06	--	--	--	5E-06	None Specified	0.005	--	--	0.005
			Cobalt	--	--	--	--	--	Thyroid	0.04	--	--	0.04
			Iron	--	--	--	--	--	GS	0.04	--	--	0.04
			Chemical Total	5E-06	--	2E-07	--	5E-06		0.09	--	--	0.09
		Exposure Point Total					5E-06					0.09	
	Exposure Medium Total					5E-06					0.09		
	Air	North Waterfront	Benzo(a)pyrene	--	3E-12	--	--	3E-12	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.0001	--	0.0001
			Chromium VI	--	5E-08	--	--	5E-08	Respiratory	--	0.000010	--	0.000010
			Cobalt	--	2E-09	--	--	2E-09	Respiratory	--	0.0001	--	0.0001
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	5E-08	--	--	5E-08		--	0.0003	--	0.0003
Exposure Point Total						5E-08					0.0003		
Exposure Medium Total					5E-08					0.0003			
Medium Total					5E-06					0.09			

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	North Waterfront	cis-1,2-Dichloroethene	--	--	--	--	--	Kidney	0.06	--	0.007	0.07
			Trichloroethene (Mutagenic)	2E-06	--	3E-07	--	2E-06	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	4E-06	--	7E-07	--	5E-06	ne System, Developm	0.7	--	0.1	0.8
			Vinyl Chloride	1E-05	--	5E-07	--	1E-05	Liver	0.01	--	0.0007	0.01
			Aluminum	--	--	--	--	--	CNS	0.009	--	0.00005	0.009
			Chromium VI	4E-06	--	2E-06	--	6E-06	None Specified	0.005	--	0.002	0.007
			Iron	--	--	--	--	--	GS	0.02	--	0.0001	0.02
			Manganese	--	--	--	--	--	CNS	0.06	--	0.008	0.07
			Chemical Total	2E-05	--	3E-06	--	2E-05		0.8	--	0.1	1.0
		Exposure Point Total						2E-05					1.0
		Exposure Medium Total						2E-05					1.0
	Air	North Waterfront	cis-1,2-Dichloroethene	--	--	--	--	--	NA	--	--	--	--
			Trichloroethene (Mutagenic)	--	4E-06	--	--	4E-06	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	--	6E-06	--	--	6E-06	Liver, Kidney	--	3	--	3
			Vinyl Chloride	--	1E-06	--	--	1E-06	Liver	--	0.007	--	0.007
			Aluminum	--	--	--	--	--	CNS	--	--	--	--
			Chromium VI	--	--	--	--	--	Respiratory	--	--	--	--
Groundwater	Groundwater	North Waterfront	Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	--	--	--
			Chemical Total	--	1E-05	--	--	1E-05		--	3	--	3
		Exposure Point Total						1E-05					3
		Exposure Medium Total						1E-05					3
	Air	North Waterfront	cis-1,2-Dichloroethene	--	--	--	--	--	NA	--	--	--	--
			Trichloroethene (Mutagenic)	--	4E-06	--	--	4E-06	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	--	6E-06	--	--	6E-06	Liver, Kidney	--	3	--	3
			Vinyl Chloride	--	1E-06	--	--	1E-06	Liver	--	0.007	--	0.007
			Aluminum	--	--	--	--	--	CNS	--	--	--	--
	Air	North Waterfront	Chromium VI	--	--	--	--	--	Respiratory	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	--	--	--
			Chemical Total	--	1E-05	--	--	1E-05		--	3	--	3
		Exposure Point Total						1E-05					3
		Exposure Medium Total						1E-05					3
Medium Total								3E-05					4
Receptor Total				Total Cancer Risks for Surface Soil and Groundwater						Total Hazard Indices for Surface Soil and Groundwater			
Receptor Total				Total Cancer Risks for Subsurface Soil and Groundwater						Total Hazard Indices for Subsurface Soil and Groundwater			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organs - Surface Soil and Groundwater		Target Organs - Subsurface Soil and Groundwater	
Total CNS HI	0.08	Total CNS HI	0.09
Total Developmental HI	0.8	Total Developmental HI	0.8
Total GS HI	0.06	Total GS HI	0.06
Total Kidney HI	3	Total Kidney HI	3
Total Liver HI	3	Total Liver HI	3
Total Respiratory HI	0.0001	Total Respiratory HI	0.0001
Total None Specified HI	0.01	Total None Specified HI	0.01
Total Thyroid HI	0.04	Total Thyroid HI	0.04

TABLE 9.12.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient									
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total					
Surface Soil	Surface Soil	North Waterfront	Benzo(a)anthracene	1E-06	--	4E-07	--	1E-06										
			Benzo(a)pyrene	8E-06	--	3E-06	--	1E-05										
			Benzo(b)fluoranthene	1E-06	--	5E-07	--	2E-06										
			Chrysene	1E-08	--	4E-09	--	1E-08										
			Dibenzo(a,h)anthracene	6E-06	--	2E-06	--	8E-06										
			Indeno(1,2,3-cd)pyrene	5E-07	--	2E-07	--	7E-07										
			Chromium VI	5E-05	--	--	--	5E-05										
			Cobalt	--	--	--	--	--										
			Iron	--	--	--	--	--										
			Chemical Total	6E-05	--	6E-06	--	7E-05										
		Exposure Point Total						7E-05										
		Exposure Medium Total						7E-05										
	Air	North Waterfront	Benzo(a)anthracene	--	2E-12	--	--	2E-12										
			Benzo(a)pyrene	--	2E-11	--	--	2E-11										
			Benzo(b)fluoranthene	--	3E-12	--	--	3E-12										
			Chrysene	--	2E-13	--	--	2E-13										
			Dibenzo(a,h)anthracene	--	1E-11	--	--	1E-11										
			Indeno(1,2,3-cd)pyrene	--	1E-12	--	--	1E-12										
			Chromium VI	--	1E-07	--	--	1E-07										
			Cobalt	--	3E-09	--	--	3E-09										
			Iron	--	--	--	--	--										
			Chemical Total	--	1E-07	--	--	1E-07										
		Exposure Point Total						1E-07										
		Exposure Medium Total						1E-07										
Medium Total									7E-05									
Subsurface Soil	Subsurface Soil	North Waterfront	Benzo(a)pyrene	2E-06	--	8E-07	--	3E-06										
			Dibenzo(a,h)anthracene	1E-06	--	4E-07	--	2E-06										
			Aluminum	--	--	--	--	--										
			Chromium VI	4E-05	--	--	--	4E-05										
			Cobalt	--	--	--	--	--										
			Iron	--	--	--	--	--										
			Chemical Total	4E-05	--	1E-06	--	4E-05										
			Exposure Point Total											4E-05				
			Exposure Medium Total											4E-05				
			Air	North Waterfront	Benzo(a)pyrene	--	5E-12	--						--	5E-12			
		Dibenzo(a,h)anthracene			--	3E-12	--	--	3E-12									
		Aluminum			--	--	--	--	--									
	Chromium VI	--			9E-08	--	--	9E-08										
	Cobalt	--			3E-09	--	--	3E-09										
	Iron	--			--	--	--	--										
	Chemical Total	--			9E-08	--	--	9E-08										
	Exposure Point Total						9E-08											
	Exposure Medium Total						9E-08											
	Medium Total									4E-05								

TABLE 9.12.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient								
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total				
Groundwater	Groundwater	North Waterfront	cis-1,2-Dichloroethene	--	--	--	--	--									
			Trichloroethene (Mutagenic)	5E-06	--	9E-07	--	6E-06									
			Trichloroethene (Nonmutagenic)	7E-06	--	1E-06	--	8E-06									
			Vinyl Chloride	9E-05	--	5E-06	--	9E-05									
			Aluminum	--	--	--	--	--									
			Chromium VI	1E-05	--	6E-06	--	2E-05									
			Iron	--	--	--	--	--									
			Manganese	--	--	--	--	--									
			Chemical Total	1E-04	--	1E-05	--	1E-04									
		Exposure Point Total						1E-04									
		Exposure Medium Total						1E-04									
	Air	North Waterfront	cis-1,2-Dichloroethene	--	--	--	--	--									
			Trichloroethene (Mutagenic)	--	6E-06	--	--	6E-06									
			Trichloroethene (Nonmutagenic)	--	8E-06	--	--	8E-06									
			Vinyl Chloride	--	5E-06	--	--	5E-06									
			Aluminum	--	--	--	--	--									
			Chromium VI	--	--	--	--	--									
			Iron	--	--	--	--	--									
			Manganese	--	--	--	--	--									
			Chemical Total	--	2E-05	--	--	2E-05									
		Exposure Point Total						2E-05									
		Exposure Medium Total						2E-05									
Medium Total									1E-04								
Receptor Total				Total Cancer Risks for Surface Soil and Groundwater					2E-04								
Receptor Total				Total Cancer Risks for Subsurface Soil and Groundwater					2E-04								

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Central Shipyard

LIST OF TABLES
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SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

9.1.RME	Current Adolescent Trespassers - Central Shipyard
9.2.RME	Current Adult Trespassers - Central Shipyard
9.3.RME	Current Lifelong Trespassers - Central Shipyard
9.4.RME	Current Industrial Workers - Central Shipyard
9.5.RME	Future Adolescent Trespassers - Central Shipyard
9.6.RME	Future Adult Trespassers - Central Shipyard
9.7.RME	Future Lifelong Trespassers - Central Shipyard
9.8.RME	Future Industrial Workers - Central Shipyard
9.9.RME	Current/Future Construction Workers - North Waterfront
9.10.RME	Hypothetical Child Residents - Central Shipyard
9.11.RME	Hypothetical Adult Residents - Central Shipyard
9.12.RME	Hypothetical Lifelong Residents - Central Shipyard

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Cecntral Shipyard	Arsenic	1E-06	--	9E-07	--	2E-06	Skin, CVS	0.02	--	0.01	0.04	
			Chromium VI	9E-07	--	--	--	9E-07	None Specified	0.001	--	--	0.001	
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01	
			Iron	--	--	--	--	--	GS	0.01	--	--	0.01	
			Manganese	--	--	--	--	--	CNS	0.005	--	--	0.005	
			Chemical Total	2E-06	--	9E-07	--	3E-06		0.05	--	0.01	0.07	
		Exposure Point Total												
		Exposure Medium Total												
	Air	Cecntral Shipyard	Arsenic	--	3E-11	--	--	3E-11	Skin, CVS	--	0.000003	--	0.000003	
			Chromium VI	--	1E-09	--	--	1E-09	Respiratory	--	0.000003	--	0.000003	
			Cobalt	--	4E-11	--	--	4E-11	Respiratory	--	0.000005	--	0.000005	
			Iron	--	--	--	--	--	NA	--	--	--	--	
			Manganese	--	--	--	--	--	CNS	--	0.00002	--	0.00002	
			Chemical Total	--	1E-09	--	--	1E-09		--	0.00003	--	0.00003	
		Exposure Point Total												
		Exposure Medium Total												
Medium Total														
Receptor Total														
			Receptor Risk Total					Receptor HI Total						

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Central Shipyard	Arsenic	2E-06	--	2E-07	--	2E-06	Skin, CVS None Specified Thyroid GS CNS	0.02	--	0.002	0.02	
			Chromium VI	4E-07	--	--	--	4E-07		0.0010	--	--	0.0010	
			Cobalt	--	--	--	--	--		0.009	--	--	0.009	
			Iron	--	--	--	--	--		0.009	--	--	0.009	
			Manganese	--	--	--	--	--		0.004	--	--	0.004	
			Chemical Total	2E-06	--	2E-07	--	3E-06		0.04	--	0.002	0.04	
		Exposure Point Total												
		Exposure Medium Total												
	Air	Central Shipyard	Arsenic	--	6E-11	--	--	6E-11	Skin, CVS Respiratory Respiratory NA CNS	--	0.000003	--	0.000003	
			Chromium VI	--	8E-10	--	--	8E-10		--	0.0000003	--	0.0000003	
			Cobalt	--	8E-11	--	--	8E-11		--	0.000005	--	0.000005	
			Iron	--	--	--	--	--		--	--	--	--	
			Manganese	--	--	--	--	--		--	0.00002	--	0.00002	
			Chemical Total	--	9E-10	--	--	9E-10		--	0.00003	--	0.00003	
		Exposure Point Total												
		Exposure Medium Total												
Medium Total														
Receptor Total			Receptor Risk Total					Receptor HI Total						

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient									
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total					
Surface Soil	Surface Soil	Central Shipyard	Arsenic	3E-06	--	1E-06	--	4E-06										
			Chromium VI	1E-06	--	--	--	1E-06										
			Cobalt	--	--	--	--	--										
			Iron	--	--	--	--	--										
			Manganese	--	--	--	--	--										
			Chemical Total	5E-06	--	1E-06	--	6E-06										
		Exposure Point Total																
		Exposure Medium Total																
	Air	Central Shipyard	Arsenic	--	9E-11	--	--	9E-11										
			Chromium VI	--	2E-09	--	--	2E-09										
			Cobalt	--	1E-10	--	--	1E-10										
			Iron	--	--	--	--	--										
			Manganese	--	--	--	--	--										
			Chemical Total	--	2E-09	--	--	2E-09										
		Exposure Point Total																
		Exposure Medium Total																
Medium Total																		
Receptor Total				Receptor Risk Total														

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Arsenic	1E-05	--	3E-06	--	2E-05	Skin, CVS	0.08	--	0.02	0.10
			Chromium VI	3E-06	--	--	--	3E-06	None Specified	0.005	--	--	0.005
			Cobalt	--	--	--	--	--	Thyroid	0.05	--	--	0.05
			Iron	--	--	--	--	--	GS	0.04	--	--	0.04
			Manganese	--	--	--	--	--	CNS	0.02	--	--	0.02
			Chemical Total	2E-05	--	3E-06	--	2E-05		0.2	--	0.02	0.2
		Exposure Point Total					2E-05					0.2	
		Exposure Medium Total					2E-05					0.2	
	Air	Central Shipyard	Arsenic	--	8E-10	--	--	8E-10	Skin, CVS	--	0.00003	--	0.00003
			Chromium VI	--	1E-08	--	--	1E-08	Respiratory	--	0.000003	--	0.000003
			Cobalt	--	1E-09	--	--	1E-09	Respiratory	--	0.00005	--	0.00005
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.0002	--	0.0002
			Chemical Total	--	1E-08	--	--	1E-08		--	0.0003	--	0.0003
		Exposure Point Total					1E-08					0.0003	
		Exposure Medium Total					1E-08					0.0003	
Medium Total					2E-05					0.2			
Receptor Total					2E-05	Receptor Risk Total				Receptor HI Total	0.2		

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene	2E-08	--	7E-08	--	1E-07	NA	--	--	--	--
			Benzo(a)pyrene	1E-07	--	3E-07	--	4E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	3E-08	--	8E-08	--	1E-07	NA	--	--	--	--
			Chrysene	2E-10	--	7E-10	--	1E-09	NA	--	--	--	--
			Arsenic	1E-06	--	9E-07	--	2E-06	Skin, CVS	0.02	--	0.01	0.03
			Chromium VI	1E-06	--	--	--	1E-06	None Specified	0.002	--	--	0.002
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01
			Iron	--	--	--	--	--	GS	0.01	--	--	0.01
			Manganese	--	--	--	--	--	CNS	0.005	--	--	0.005
			Chemical Total	2E-06	--	1E-06	--	4E-06		0.05	--	0.01	0.07
		Exposure Point Total					4E-06					0.07	
		Exposure Medium Total					4E-06					0.07	
	Air	Central Shipyard	Benzo(a)anthracene	--	3E-14	--	--	3E-14	NA	--	--	--	--
			Benzo(a)pyrene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Benzo(b)fluoranthene	--	3E-14	--	--	3E-14	NA	--	--	--	--
			Chrysene	--	3E-15	--	--	3E-15	NA	--	--	--	--
			Arsenic	--	3E-11	--	--	3E-11	Skin, CVS	--	0.000003	--	0.000003
			Chromium VI	--	1E-09	--	--	1E-09	Respiratory	--	0.0000003	--	0.0000003
			Cobalt	--	4E-11	--	--	4E-11	Respiratory	--	0.000005	--	0.000005
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.00002	--	0.00002
			Chemical Total	--	1E-09	--	--	1E-09		--	0.00003	--	0.00003
		Exposure Point Total					1E-09					0.00003	
		Exposure Medium Total					1E-09					0.00003	
Medium Total					4E-06					0.07			

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	2E-08	--	7E-08	--	9E-08	NA	--	--	--	--
			Benzo(a)pyrene	2E-07	--	5E-07	--	6E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	2E-08	--	6E-08	--	8E-08	NA	--	--	--	--
			Chrysene	2E-10	--	7E-10	--	9E-10	NA	--	--	--	--
			Dibenzo(a,h)anthracene	4E-08	--	1E-07	--	1E-07	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2E-08	--	5E-08	--	6E-08	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.003	--	--	0.003
			Arsenic	1E-06	--	7E-07	--	2E-06	Skin, CVS	0.02	--	0.01	0.03
			Chromium VI	7E-07	--	--	--	7E-07	None Specified	0.001	--	--	0.001
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01
			Iron	--	--	--	--	--	GS	0.01	--	--	0.01
			Chemical Total	2E-06	--	1E-06	--	3E-06		0.04	--	0.01	0.05
			Exposure Point Total					3E-06					0.05
		Exposure Medium Total					3E-06					0.05	
		Air	Central Shipyard	Benzo(a)anthracene	--	3E-14	--	--	3E-14	NA	--	--	--
	Benzo(a)pyrene			--	2E-13	--	--	2E-13	NA	--	--	--	--
	Benzo(b)fluoranthene			--	2E-14	--	--	2E-14	NA	--	--	--	--
	Chrysene			--	3E-15	--	--	3E-15	NA	--	--	--	--
	Dibenzo(a,h)anthracene			--	5E-14	--	--	5E-14	NA	--	--	--	--
	Indeno(1,2,3-cd)pyrene			--	2E-14	--	--	2E-14	NA	--	--	--	--
	Aluminum			--	--	--	--	--	CNS	--	0.000004	--	0.000004
	Arsenic			--	2E-11	--	--	2E-11	Skin, CVS	--	0.000002	--	0.000002
	Chromium VI			--	1E-09	--	--	1E-09	Respiratory	--	0.0000003	--	0.0000003
	Cobalt			--	3E-11	--	--	3E-11	Respiratory	--	0.000004	--	0.000004
	Iron			--	--	--	--	--	NA	--	--	--	--
	Chemical Total			--	1E-09	--	--	1E-09		--	0.00001	--	0.00001
	Exposure Point Total						1E-09					0.00001	
	Exposure Medium Total					1E-09					0.00001		
Medium Total					3E-06					0.05			
Receptor Total					7E-06	Receptor Risk Total				Receptor HI Total	0.1		

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene	1E-08	--	6E-09	--	2E-08	NA	--	--	--	--
			Benzo(a)pyrene	5E-08	--	3E-08	--	8E-08	NA	--	--	--	--
			Benzo(b)fluoranthene	1E-08	--	7E-09	--	2E-08	NA	--	--	--	--
			Chrysene	1E-10	--	6E-11	--	2E-10	NA	--	--	--	--
			Arsenic	2E-06	--	2E-07	--	2E-06	Skin, CVS	0.01	--	0.002	0.02
			Chromium VI	5E-07	--	--	--	5E-07	None Specified	0.001	--	--	0.001
			Cobalt	--	--	--	--	--	Thyroid	0.009	--	--	0.009
			Iron	--	--	--	--	--	GS	0.009	--	--	0.009
			Manganese	--	--	--	--	--	CNS	0.003	--	--	0.003
			Chemical Total	2E-06	--	3E-07	--	3E-06		0.04	--	0.002	0.04
		Exposure Point Total					3E-06					0.04	
		Exposure Medium Total					3E-06					0.04	
	Air	Central Shipyard	Benzo(a)anthracene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Benzo(a)pyrene	--	9E-14	--	--	9E-14	NA	--	--	--	--
			Benzo(b)fluoranthene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Chrysene	--	2E-15	--	--	2E-15	NA	--	--	--	--
			Arsenic	--	6E-11	--	--	6E-11	Skin, CVS	--	0.000003	--	0.000003
			Chromium VI	--	8E-10	--	--	8E-10	Respiratory	--	0.0000003	--	0.0000003
			Cobalt	--	7E-11	--	--	7E-11	Respiratory	--	0.000005	--	0.000005
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.00002	--	0.00002
			Chemical Total	--	1E-09	--	--	1E-09		--	0.00003	--	0.00003
		Exposure Point Total					1E-09					0.00003	
		Exposure Medium Total					1E-09					0.00003	
Medium Total					3E-06					0.04			

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	1E-08	--	6E-09	--	2E-08	NA	--	--	--	--
			Benzo(a)pyrene	8E-08	--	4E-08	--	1E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	1E-08	--	5E-09	--	1E-08	NA	--	--	--	--
			Chrysene	1E-10	--	6E-11	--	2E-10	NA	--	--	--	--
			Dibenzo(a,h)anthracene	2E-08	--	9E-09	--	3E-08	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8E-09	--	4E-09	--	1E-08	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.002	--	--	0.002
			Arsenic	1E-06	--	2E-07	--	2E-06	Skin, CVS	0.01	--	0.001	0.01
			Chromium VI	4E-07	--	--	--	4E-07	None Specified	0.0008	--	--	0.0008
			Cobalt	--	--	--	--	--	Thyroid	0.008	--	--	0.008
			Iron	--	--	--	--	--	GS	0.007	--	--	0.007
			Chemical Total	2E-06	--	2E-07	--	2E-06		0.03	--	0.001	0.03
		Exposure Point Total						2E-06					0.03
		Exposure Medium Total						2E-06					0.03
	Air	Central Shipyard	Benzo(a)anthracene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Benzo(a)pyrene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Benzo(b)fluoranthene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Chrysene	--	2E-15	--	--	2E-15	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	3E-14	--	--	3E-14	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	1E-14	--	--	1E-14	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.000004	--	0.000004
			Arsenic	--	5E-11	--	--	5E-11	Skin, CVS	--	0.000002	--	0.000002
			Chromium VI	--	6E-10	--	--	6E-10	Respiratory	--	0.000003	--	0.000003
			Cobalt	--	6E-11	--	--	6E-11	Respiratory	--	0.000004	--	0.000004
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	7E-10	--	--	7E-10		--	0.00001	--	0.00001
		Exposure Point Total						7E-10					0.00001
		Exposure Medium Total						7E-10					0.00001
Medium Total								2E-06					0.03
Receptor Total								5E-06					0.07

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene	4E-08	--	8E-08	--	1E-07					
			Benzo(a)pyrene	2E-07	--	4E-07	--	5E-07					
			Benzo(b)fluoranthene	4E-08	--	9E-08	--	1E-07					
			Chrysene	4E-10	--	8E-10	--	1E-09					
			Arsenic	3E-06	--	1E-06	--	4E-06					
			Chromium VI	1E-06	--	--	--	1E-06					
			Cobalt	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Chemical Total	5E-06	--	2E-06	--	7E-06					
		Exposure Point Total					7E-06						
		Exposure Medium Total					7E-06						
	Air	Central Shipyard	Benzo(a)anthracene	--	5E-14	--	--	5E-14					
			Benzo(a)pyrene	--	2E-13	--	--	2E-13					
			Benzo(b)fluoranthene	--	5E-14	--	--	5E-14					
			Chrysene	--	5E-15	--	--	5E-15					
			Arsenic	--	9E-11	--	--	9E-11					
			Chromium VI	--	2E-09	--	--	2E-09					
			Cobalt	--	1E-10	--	--	1E-10					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Chemical Total	--	2E-09	--	--	2E-09					
		Exposure Point Total					2E-09						
		Exposure Medium Total					2E-09						
Medium Total								7E-06					

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	3E-08	--	7E-08	--	1E-07					
			Benzo(a)pyrene	2E-07	--	5E-07	--	7E-07					
			Benzo(b)fluoranthene	3E-08	--	6E-08	--	9E-08					
			Chrysene	3E-10	--	7E-10	--	1E-09					
			Dibenzo(a,h)anthracene	6E-08	--	1E-07	--	2E-07					
			Indeno(1,2,3-cd)pyrene	2E-08	--	5E-08	--	8E-08					
			Aluminum	--	--	--	--	--					
			Arsenic	3E-06	--	9E-07	--	3E-06					
			Chromium VI	1E-06	--	--	--	1E-06					
			Cobalt	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Chemical Total	4E-06	--	2E-06	--	6E-06					
		Exposure Point Total						6E-06					
		Exposure Medium Total						6E-06					
	Air	Central Shipyard	Benzo(a)anthracene	--	4E-14	--	--	4E-14					
			Benzo(a)pyrene	--	3E-13	--	--	3E-13					
			Benzo(b)fluoranthene	--	4E-14	--	--	4E-14					
			Chrysene	--	4E-15	--	--	4E-15					
			Dibenzo(a,h)anthracene	--	8E-14	--	--	8E-14					
			Indeno(1,2,3-cd)pyrene	--	3E-14	--	--	3E-14					
			Aluminum	--	--	--	--	--					
			Arsenic	--	7E-11	--	--	7E-11					
			Chromium VI	--	2E-09	--	--	2E-09					
			Cobalt	--	9E-11	--	--	9E-11					
			Iron	--	--	--	--	--					
			Chemical Total	--	2E-09	--	--	2E-09					
		Exposure Point Total						2E-09					
		Exposure Medium Total						2E-09					
Medium Total								6E-06					
Receptor Total								1E-05					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene	8E-08	--	7E-08	--	1E-07	NA	--	--	--	--		
			Benzo(a)pyrene	4E-07	--	3E-07	--	7E-07	NA	--	--	--	--		
			Benzo(b)fluoranthene	9E-08	--	7E-08	--	2E-07	NA	--	--	--	--		
			Chrysene	8E-10	--	7E-10	--	1E-09	NA	--	--	--	--		
			Arsenic	1E-05	--	2E-06	--	1E-05	Skin, CVS	0.08	--	0.02	0.09		
			Chromium VI	3E-06	--	--	--	3E-06	None Specified	0.0008	--	--	0.0008		
			Cobalt	--	--	--	--	--	Thyroid	0.005	--	--	0.005		
			Iron	--	--	--	--	--	GS	0.05	--	--	0.05		
			Manganese	--	--	--	--	--	CNS	0.02	--	--	0.02		
			Chemical Total	2E-05	--	3E-06	--	2E-05		0.1	--	0.02	0.2		
			Exposure Point Total							2E-05					0.2
			Exposure Medium Total							2E-05					0.2
	Air	Central Shipyard	Benzo(a)anthracene	--	2E-13	--	--	2E-13	NA	--	--	--	--		
			Benzo(a)pyrene	--	1E-12	--	--	1E-12	NA	--	--	--	--		
			Benzo(b)fluoranthene	--	3E-13	--	--	3E-13	NA	--	--	--	--		
			Chrysene	--	2E-14	--	--	2E-14	NA	--	--	--	--		
			Arsenic	--	8E-10	--	--	8E-10	Skin, CVS	--	0.00003	--	0.00003		
			Chromium VI	--	1E-08	--	--	1E-08	Respiratory	--	0.000004	--	0.000004		
			Cobalt	--	1E-09	--	--	1E-09	Respiratory	--	0.00002	--	0.00002		
			Iron	--	--	--	--	--	NA	--	--	--	--		
			Manganese	--	--	--	--	--	CNS	--	0.0002	--	0.0002		
			Chemical Total	--	1E-08	--	--	1E-08		--	0.0002	--	0.0002		
			Exposure Point Total							1E-08					0.0002
			Exposure Medium Total							1E-08					0.0002
Medium Total							2E-05					0.2			
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	7E-08	--	6E-08	--	1E-07	NA	--	--	--	--		
			Benzo(a)pyrene	5E-07	--	4E-07	--	9E-07	NA	--	--	--	--		
			Benzo(b)fluoranthene	6E-08	--	5E-08	--	1E-07	NA	--	--	--	--		
			Chrysene	7E-10	--	6E-10	--	1E-09	NA	--	--	--	--		
			Dibenzo(a,h)anthracene	1E-07	--	1E-07	--	2E-07	NA	--	--	--	--		
			Indeno(1,2,3-cd)pyrene	5E-08	--	4E-08	--	9E-08	NA	--	--	--	--		
			Aluminum	--	--	--	--	--	CNS	0.010	--	--	0.010		
			Arsenic	1E-05	--	2E-06	--	1E-05	Skin, CVS	0.06	--	0.01	0.07		
			Chromium VI	2E-06	--	--	--	2E-06	None Specified	0.0007	--	--	0.0007		
			Cobalt	--	--	--	--	--	Thyroid	0.004	--	--	0.004		
			Iron	--	--	--	--	--	GS	0.04	--	--	0.04		
			Chemical Total	1E-05	--	3E-06	--	2E-05		0.1	--	0.01	0.1		
Exposure Point Total							2E-05					0.1			
Exposure Medium Total							2E-05					0.1			

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	Central Shipyard	Benzo(a)anthracene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Benzo(a)pyrene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Benzo(b)fluoranthene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Chrysene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	4E-13	--	--	4E-13	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.00004	--	0.00004
			Arsenic	--	6E-10	--	--	6E-10	Skin, CVS	--	0.00003	--	0.00003
			Chromium VI	--	8E-09	--	--	8E-09	Respiratory	--	0.000003	--	0.000003
			Cobalt	--	8E-10	--	--	8E-10	Respiratory	--	0.00001	--	0.00001
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	1E-08	--	--	1E-08		--	0.00008	--	0.00008
		Exposure Point Total					1E-08					0.00008	
		Exposure Medium Total					1E-08					0.00008	
Medium Total					2E-05					0.1			
Groundwater	Groundwater	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.003	--	0.000001	0.003
			Arsenic	4E-04	--	2E-07	--	4E-04	Skin, CVS	3	--	0.001	3
			Cadmium	--	--	--	--	--	Kidney	0.03	--	0.0003	0.03
			Cobalt	--	--	--	--	--	Thyroid	0.08	--	0.00001	0.08
			Iron	--	--	--	--	--	GS	0.9	--	0.0004	0.9
			Manganese	--	--	--	--	--	CNS	4	--	0.04	4
			Chemical Total	4E-04	--	2E-07	--	4E-04		7	--	0.04	7
			Exposure Point Total					4E-04					7
		Exposure Medium Total					4E-04					7	
		Medium Total					4E-04					7	
Receptor Total	Total Cancer Risks for Surface Soil and Subsurface Soil							Total Hazard Indices for Surface Soil and Subsurface Soil					
Receptor Total	Total Cancer Risks for Subsurface Soil and Subsurface Soil							Total Hazard Indices for Subsurface Soil and Subsurface Soil					
	4E-04							7					
	4E-04							7					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organ HI - Surface Soil and Groundwater

Total CNS HI	4
Total CVS HI	3
Total GS HI	1
Total Respiratory HI	0.00002
Total None Specified HI	0.001
Total Skin HI	3
Total Thyroid HI	0.09

Target Organ HI - Subsurface Soil and Groundwater

Total CNS HI	4
Total CVS HI	3
Total GS HI	1
Total Respiratory HI	0.00002
Total None Specified HI	0.001
Total Skin HI	3
Total Thyroid HI	0.08

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene	5E-09	--	2E-09	--	7E-09	NA	--	--	--	--
			Benzo(a)pyrene	2E-08	--	1E-08	--	3E-08	NA	--	--	--	--
			Benzo(b)fluoranthene	6E-09	--	2E-09	--	8E-09	NA	--	--	--	--
			Chrysene	5E-11	--	2E-11	--	7E-11	NA	--	--	--	--
			Arsenic	9E-07	--	8E-08	--	9E-07	Skin, CVS	0.1	--	0.01	0.1
			Chromium VI	2E-07	--	--	--	2E-07	None Specified	0.001	--	--	0.001
			Cobalt	--	--	--	--	--	Thyroid	0.008	--	--	0.008
			Iron	--	--	--	--	--	GS	0.08	--	--	0.08
			Manganese	--	--	--	--	--	CNS	0.03	--	--	0.03
			Chemical Total	1E-06	--	9E-08	--	1E-06		0.3	--	0.01	0.3
		Exposure Point Total					1E-06					0.3	
		Exposure Medium Total					1E-06					0.3	
	Air	Central Shipyard	Benzo(a)anthracene	--	4E-11	--	--	4E-11	NA	--	--	--	--
			Benzo(a)pyrene	--	2E-10	--	--	2E-10	NA	--	--	--	--
			Benzo(b)fluoranthene	--	5E-11	--	--	5E-11	NA	--	--	--	--
			Chrysene	--	4E-12	--	--	4E-12	NA	--	--	--	--
			Arsenic	--	1E-07	--	--	1E-07	Skin, CVS	--	0.1	--	0.1
			Chromium VI	--	2E-06	--	--	2E-06	Respiratory	--	0.01	--	0.01
			Cobalt	--	2E-07	--	--	2E-07	Respiratory	--	0.06	--	0.06
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.7	--	0.7
			Chemical Total	--	2E-06	--	--	2E-06		--	0.9	--	0.9
		Exposure Point Total					2E-06					0.9	
		Exposure Medium Total					2E-06					0.9	
Medium Total					3E-06					1			

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	5E-09	--	2E-09	--	7E-09	NA	--	--	--	--
			Benzo(a)pyrene	3E-08	--	1E-08	--	5E-08	NA	--	--	--	--
			Benzo(b)fluoranthene	4E-09	--	2E-09	--	6E-09	NA	--	--	--	--
			Chrysene	5E-11	--	2E-11	--	7E-11	NA	--	--	--	--
			Dibenzo(a,h)anthracene	8E-09	--	3E-09	--	1E-08	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	4E-09	--	1E-09	--	5E-09	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.02	--	--	0.02
			Arsenic	7E-07	--	6E-08	--	7E-07	Skin, CVS	0.1	--	0.009	0.1
			Chromium VI	2E-07	--	--	--	2E-07	None Specified	0.001	--	--	0.001
			Cobalt	--	--	--	--	--	Thyroid	0.007	--	--	0.007
			Iron	--	--	--	--	--	GS	0.06	--	--	0.06
			Chemical Total	9E-07	--	8E-08	--	1E-06		0.2	--	0.009	0.2
		Exposure Point Total					1E-06					0.2	
		Exposure Medium Total							1E-06				0.2
	Air	Central Shipyard	Benzo(a)anthracene	--	4E-11	--	--	4E-11	NA	--	--	--	--
			Benzo(a)pyrene	--	3E-10	--	--	3E-10	NA	--	--	--	--
			Benzo(b)fluoranthene	--	3E-11	--	--	3E-11	NA	--	--	--	--
			Chrysene	--	4E-12	--	--	4E-12	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	7E-11	--	--	7E-11	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	3E-11	--	--	3E-11	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.2	--	0.2
			Arsenic	--	1E-07	--	--	1E-07	Skin, CVS	--	0.1	--	0.1
			Chromium VI	--	1E-06	--	--	1E-06	Respiratory	--	0.01	--	0.01
			Cobalt	--	1E-07	--	--	1E-07	Respiratory	--	0.05	--	0.05
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	2E-06	--	--	2E-06		--	0.3	--	0.3
		Exposure Point Total					2E-06					0.3	
		Exposure Medium Total							2E-06				0.3
Medium Total							3E-06				0.5		
Groundwater	Groundwater	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.00008	--	0.00004	0.0001
			Arsenic	4E-07	--	2E-07	--	7E-07	Skin, CVS	0.07	--	0.03	0.1
			Cadmium	--	--	--	--	--	Kidney	0.0008	--	0.01	0.009
			Cobalt	--	--	--	--	--	Thyroid	0.002	--	0.0004	0.003
			Iron	--	--	--	--	--	GS	0.02	--	0.01	0.04
			Manganese	--	--	--	--	--	CNS	0.1	--	1	1
			Chemical Total	4E-07	--	2E-07	--	7E-07		0.2	--	1	2
		Exposure Point Total					7E-07					2	
		Exposure Medium Total							7E-07				2
		Medium Total							7E-07				2
Receptor Total				Total Cancer Risks for Surface Soil and Subsurface Soil				Total Hazard Indices for Surface Soil and Subsurface Soil				3	
Receptor Total				Total Cancer Risks for Subsurface Soil and Subsurface Soil				Total Hazard Indices for Subsurface Soil and Subsurface Soil				2	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organ HIs - Surface Soil and Groundwater

Total CNS HI	2
Total CVS HI	0.4
Total GS HI	0.1
Total Respiratory HI	0.08
Total None Specified HI	0.001
Total Skin HI	0.4
Total Thyroid HI	0.01

Target Organ HIs - Subsurface Soil and Groundwater

Total CNS HI	2
Total CVS HI	0.3
Total GS HI	0.1
Total Respiratory HI	0.06
Total None Specified HI	0.001
Total Skin HI	0.3
Total Thyroid HI	0.009

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene	1E-06	--	5E-07	--	2E-06	NA	--	--	--	--
			Benzo(a)pyrene	6E-06	--	2E-06	--	8E-06	NA	--	--	--	--
			Benzo(b)fluoranthene	1E-06	--	5E-07	--	2E-06	NA	--	--	--	--
			Chrysene	1E-08	--	5E-09	--	2E-08	NA	--	--	--	--
			Arsenic	4E-05	--	3E-06	--	4E-05	Skin, CVS	1	--	0.08	1
			Chromium VI	5E-05	--	--	--	5E-05	None Specified	0.07	--	--	0.07
			Cobalt	--	--	--	--	--	Thyroid	0.6	--	--	0.6
			Iron	--	--	--	--	--	GS	0.6	--	--	0.6
			Manganese	--	--	--	--	--	CNS	0.2	--	--	0.2
			Chemical Total	1E-04	--	6E-06	--	1E-04		3	--	0.08	3
		Exposure Point Total					1E-04					3	
		Exposure Medium Total					1E-04					3	
	Air	Central Shipyard	Benzo(a)anthracene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Benzo(a)pyrene	--	6E-12	--	--	6E-12	NA	--	--	--	--
			Benzo(b)fluoranthene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Chrysene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Arsenic	--	8E-10	--	--	8E-10	Skin, CVS	--	0.0001	--	0.0001
			Chromium VI	--	6E-08	--	--	6E-08	Respiratory	--	0.00002	--	0.00002
			Cobalt	--	1E-09	--	--	1E-09	Respiratory	--	0.0002	--	0.0002
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.0008	--	0.0008
			Chemical Total	--	6E-08	--	--	6E-08		--	0.001	--	0.001
		Exposure Point Total					6E-08					0.001	
		Exposure Medium Total					6E-08					0.001	
Medium Total					1E-04					3			

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	1E-06	--	4E-07	--	2E-06	NA	--	--	--	--
			Benzo(a)pyrene	8E-06	--	3E-06	--	1E-05	NA	--	--	--	--
			Benzo(b)fluoranthene	1E-06	--	4E-07	--	1E-06	NA	--	--	--	--
			Chrysene	1E-08	--	4E-09	--	2E-08	NA	--	--	--	--
			Dibenzo(a,h)anthracene	2E-06	--	7E-07	--	3E-06	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	9E-07	--	3E-07	--	1E-06	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.1	--	--	0.1
			Arsenic	3E-05	--	3E-06	--	3E-05	Skin, CVS	0.8	--	0.07	0.9
			Chromium VI	4E-05	--	--	--	4E-05	None Specified	0.06	--	--	0.06
			Cobalt	--	--	--	--	--	Thyroid	0.5	--	--	0.5
			Iron	--	--	--	--	--	GS	0.5	--	--	0.5
			Chemical Total	8E-05	--	7E-06	--	9E-05		2	--	0.07	2
		Exposure Point Total					9E-05					2	
		Exposure Medium Total					9E-05					2	
	Air	Central Shipyard	Benzo(a)anthracene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Benzo(a)pyrene	--	9E-12	--	--	9E-12	NA	--	--	--	--
			Benzo(b)fluoranthene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Chrysene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	9E-13	--	--	9E-13	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.0002	--	0.0002
			Arsenic	--	6E-10	--	--	6E-10	Skin, CVS	--	0.0001	--	0.0001
			Chromium VI	--	4E-08	--	--	4E-08	Respiratory	--	0.00001	--	0.00001
			Cobalt	--	8E-10	--	--	8E-10	Respiratory	--	0.0002	--	0.0002
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	5E-08	--	--	5E-08		--	0.0005	--	0.0005
		Exposure Point Total					5E-08					0.0005	
		Exposure Medium Total					5E-08					0.0005	
Medium Total								9E-05				2	
Groundwater	Groundwater	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.02	--	0.0001	0.02
			Arsenic	6E-04	--	4E-06	--	6E-04	Skin, CVS	17	--	0.1	17
			Cadmium	--	--	--	--	--	Kidney	0.2	--	0.0	0.2
			Cobalt	--	--	--	--	--	Thyroid	5	--	0.01	5
			Iron	--	--	--	--	--	GS	6	--	0.04	6
			Manganese	--	--	--	--	--	CNS	24	--	4	28
		Chemical Total	6E-04	--	4E-06	--	6E-04		52	--	4	57	
	Exposure Point Total					6E-04					57		
	Exposure Medium Total					6E-04					57		
Medium Total								6E-04				57	
Receptor Total				Total Cancer Risks for Surface Soil and Subsurface Soil					Total Hazard Indices for Surface Soil and Subsurface Soil				
				8E-04					59				
Receptor Total				Total Cancer Risks for Subsurface Soil and Subsurface Soil					Total Hazard Indices for Subsurface Soil and Subsurface Soil				
				7E-04					59				

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organ HIs - Surface Soil and Groundwater

Total CNS HI	28
Total CVS HI	18
Total GS HI	7
Total Respiratory HI	0.0002
Total None Specified HI	0.1
Total Skin HI	18
Total Thyroid HI	6

Target Organ HIs - Subsurface Soil and Groundwater

Total CNS HI	28
Total CVS HI	18
Total GS HI	7
Total Respiratory HI	0.0002
Total None Specified HI	0.1
Total Skin HI	18
Total Thyroid HI	6

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene	2E-07	--	1E-07	--	3E-07	NA	--	--	--	--
			Benzo(a)pyrene	9E-07	--	5E-07	--	1E-06	NA	--	--	--	--
			Benzo(b)fluoranthene	2E-07	--	1E-07	--	3E-07	NA	--	--	--	--
			Chrysene	2E-09	--	1E-09	--	3E-09	NA	--	--	--	--
			Arsenic	2E-05	--	2E-05	--	2E-05	Skin, CVS	0.1	--	0.01	0.1
			Chromium VI	7E-06	--	--	--	7E-06	None Specified	0.008	--	--	0.008
			Cobalt	--	--	--	--	--	Thyroid	0.07	--	--	0.07
			Iron	--	--	--	--	--	GS	0.06	--	--	0.06
			Manganese	--	--	--	--	--	CNS	0.02	--	--	0.02
			Chemical Total	3E-05	--	3E-06	--	3E-05		0.3	--	0.01	0.3
		Exposure Point Total					3E-05					0.3	
		Exposure Medium Total					3E-05					0.3	
	Air	Central Shipyard	Benzo(a)anthracene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Benzo(a)pyrene	--	8E-12	--	--	8E-12	NA	--	--	--	--
			Benzo(b)fluoranthene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Chrysene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Arsenic	--	3E-09	--	--	3E-09	Skin, CVS	--	0.0001	--	0.0001
			Chromium VI	--	8E-08	--	--	8E-08	Respiratory	--	0.00002	--	0.00002
			Cobalt	--	4E-09	--	--	4E-09	Respiratory	--	0.0002	--	0.0002
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.0008	--	0.0008
			Chemical Total	--	9E-08	--	--	9E-08		--	0.001	--	0.001
		Exposure Point Total					9E-08					0.001	
		Exposure Medium Total					9E-08					0.001	
Medium Total								3E-05				0.3	

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	2E-07	--	9E-08	--	3E-07	NA	--	--	--	--
			Benzo(a)pyrene	1E-06	--	6E-07	--	2E-06	NA	--	--	--	--
			Benzo(b)fluoranthene	2E-07	--	8E-08	--	2E-07	NA	--	--	--	--
			Chrysene	2E-09	--	9E-10	--	3E-09	NA	--	--	--	--
			Dibenzo(a,h)anthracene	3E-07	--	1E-07	--	4E-07	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1E-07	--	7E-08	--	2E-07	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.01	--	--	0.01
			Arsenic	1E-05	--	2E-06	--	1E-05	Skin, CVS	0.08	--	0.01	0.09
			Chromium VI	6E-06	--	--	--	6E-06	None Specified	0.006	--	--	0.006
			Cobalt	--	--	--	--	--	Thyroid	0.06	--	--	0.06
			Iron	--	--	--	--	--	GS	0.05	--	--	0.05
			Chemical Total	2E-05	--	3E-06	--	2E-05		0.2	--	0.01	0.2
		Exposure Point Total					2E-05					0.2	
		Exposure Medium Total					2E-05					0.2	
	Air	Central Shipyard	Benzo(a)anthracene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Benzo(a)pyrene	--	1E-11	--	--	1E-11	NA	--	--	--	--
			Benzo(b)fluoranthene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Chrysene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	3E-12	--	--	3E-12	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.0002	--	0.0002
			Arsenic	--	2E-09	--	--	2E-09	Skin, CVS	--	0.0001	--	0.0001
			Chromium VI	--	6E-08	--	--	6E-08	Respiratory	--	0.00001	--	0.00001
			Cobalt	--	3E-09	--	--	3E-09	Respiratory	--	0.0002	--	0.0002
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	7E-08	--	--	7E-08		--	0.0005	--	0.0005
		Exposure Point Total					7E-08					0.0005	
		Exposure Medium Total					7E-08					0.0005	
Medium Total								2E-05				0.2	
Groundwater	Groundwater	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.009	--	0.00004	0.009
			Arsenic	1E-03	--	6E-06	--	1E-03	Skin, CVS	7	--	0.04	7
			Cadmium	--	--	--	--	--	Kidney	0.08	--	0.01	0.09
			Cobalt	--	--	--	--	--	Thyroid	2	--	0.005	2
			Iron	--	--	--	--	--	GS	3	--	0.01	3
			Manganese	--	--	--	--	--	CNS	10	--	1	12
		Chemical Total	1E-03	--	6E-06	--	1E-03		22	--	1	24	
	Exposure Point Total					1E-03					24		
	Exposure Medium Total					1E-03					24		
Medium Total								1E-03				24	
Receptor Total				Total Cancer Risks for Surface Soil and Subsurface Soil					Total Hazard Indices for Surface Soil and Subsurface Soil				
Receptor Total				Total Cancer Risks for Subsurface Soil and Subsurface Soil					Total Hazard Indices for Subsurface Soil and Subsurface Soil				

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organ HIs - Surface Soil and Groundwater

Total CNS HI	12
Total CVS HI	7
Total GS HI	3
Total Respiratory HI	0.0002
Total None Specified HI	0.01
Total Skin HI	7
Total Thyroid HI	2

Target Organ HIs - Subsurface Soil and Groundwater

Total CNS HI	12
Total CVS HI	7
Total GS HI	3
Total Respiratory HI	0.0002
Total None Specified HI	0.01
Total Skin HI	7
Total Thyroid HI	2

TABLE 9.12.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient										
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total						
Surface Soil	Surface Soil	Central Shipyard	Benzo(a)anthracene	1E-06	--	6E-07	--	2E-06											
			Benzo(a)pyrene	7E-06	--	3E-06	--	9E-06											
			Benzo(b)fluoranthene	2E-06	--	6E-07	--	2E-06											
			Chrysene	1E-08	--	6E-09	--	2E-08											
			Arsenic	6E-05	--	5E-06	--	6E-05											
			Chromium VI	6E-05	--	--	--	6E-05											
			Cobalt	--	--	--	--	--											
			Iron	--	--	--	--	--											
			Manganese	--	--	--	--	--											
			Chemical Total	1E-04	--	9E-06	--	1E-04											
			Exposure Point Total											1E-04					
			Exposure Medium Total											1E-04					
	Air	Central Shipyard	Benzo(a)anthracene	--	3E-12	--	--	3E-12											
			Benzo(a)pyrene	--	1E-11	--	--	1E-11											
			Benzo(b)fluoranthene	--	4E-12	--	--	4E-12											
			Chrysene	--	3E-13	--	--	3E-13											
			Arsenic	--	4E-09	--	--	4E-09											
			Chromium VI	--	1E-07	--	--	1E-07											
			Cobalt	--	5E-09	--	--	5E-09											
			Iron	--	--	--	--	--											
			Manganese	--	--	--	--	--											
			Chemical Total	--	1E-07	--	--	1E-07											
			Exposure Point Total											1E-07					
			Exposure Medium Total											1E-07					
Medium Total							1E-04												

TABLE 9.12.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient										
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total						
Subsurface Soil	Subsurface Soil	Central Shipyard	Benzo(a)anthracene	1E-06	--	5E-07	--	2E-06											
			Benzo(a)pyrene	9E-06	--	4E-06	--	1E-05											
			Benzo(b)fluoranthene	1E-06	--	5E-07	--	2E-06											
			Chrysene	1E-08	--	5E-09	--	2E-08											
			Dibenzo(a,h)anthracene	2E-06	--	9E-07	--	3E-06											
			Indeno(1,2,3-cd)pyrene	1E-06	--	4E-07	--	1E-06											
			Aluminum	--	--	--	--	--											
			Arsenic	4E-05	--	4E-06	--	5E-05											
			Chromium VI	4E-05	--	--	--	4E-05											
			Cobalt	--	--	--	--	--											
			Iron	--	--	--	--	--											
			Chemical Total	1E-04	--	1E-05	--	1E-04											
			Exposure Point Total											1E-04					
			Exposure Medium Total											1E-04					
	Air	Central Shipyard	Benzo(a)anthracene	--	3E-12	--	--	3E-12											
			Benzo(a)pyrene	--	2E-11	--	--	2E-11											
			Benzo(b)fluoranthene	--	3E-12	--	--	3E-12											
			Chrysene	--	3E-13	--	--	3E-13											
			Dibenzo(a,h)anthracene	--	5E-12	--	--	5E-12											
			Indeno(1,2,3-cd)pyrene	--	2E-12	--	--	2E-12											
			Aluminum	--	--	--	--	--											
			Arsenic	--	3E-09	--	--	3E-09											
			Chromium VI	--	1E-07	--	--	1E-07											
			Cobalt	--	4E-09	--	--	4E-09											
			Iron	--	--	--	--	--											
			Chemical Total	--	1E-07	--	--	1E-07											
			Exposure Point Total											1E-07					
			Exposure Medium Total											1E-07					
Medium Total							1E-04												
Groundwater	Groundwater	Central Shipyard	Aluminum	--	--	--	--	--											
			Arsenic	2E-03	--	1E-05	--	2E-03											
			Cadmium	--	--	--	--	--											
			Cobalt	--	--	--	--	--											
			Iron	--	--	--	--	--											
			Manganese	--	--	--	--	--											
			Chemical Total	2E-03	--	1E-05	--	2E-03											
			Exposure Point Total											2E-03					
			Exposure Medium Total											2E-03					
			Medium Total											2E-03					
Total Cancer Risks for Surface Soil and Subsurface Soil							2E-03												
Total Cancer Risks for Subsurface Soil and Subsurface Soil							2E-03												

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Former Building 234

LIST OF TABLES
RAGS PART D TABLE 9 - FORMER BUILDING 234
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

9.1.RME	Current Adolescent Trespassers - Former Building 234
9.2.RME	Current Adult Trespassers - Former Building 234
9.3.RME	Current Lifelong Trespassers - Former Building 234
9.4.RME	Current Industrial Workers - Former Building 234
9.5.RME	Future Adolescent Trespassers - Former Building 234
9.6.RME	Future Adult Trespassers - Former Building 234
9.7.RME	Future Lifelong Trespassers - Former Building 234
9.8.RME	Future Industrial Workers - Former Building 234
9.9.RME	Current/Future Construction Workers - North Waterfront
9.10.RME	Hypothetical Child Residents - Former Building 234
9.11.RME	Hypothetical Adult Residents - Former Building 234
9.12.RME	Hypothetical Lifelong Residents - Former Building 234

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	3E-08	--	8E-08	--	1E-07	NA	--	--	--	--	
			Benzo(a)pyrene	2E-07	--	7E-07	--	9E-07	NA	--	--	--	--	
			Benzo(b)fluoranthene	4E-08	--	1E-07	--	2E-07	NA	--	--	--	--	
			Chrysene	3E-10	--	1E-09	--	1E-09	NA	--	--	--	--	
			Dibenzo(a,h)anthracene	5E-08	--	1E-07	--	2E-07	NA	--	--	--	--	
			Indeno(1,2,3-cd)pyrene	1E-08	--	4E-08	--	6E-08	NA	--	--	--	--	
			Arsenic	1E-06	--	7E-07	--	2E-06	Skin, CVS	0.02	--	0.01	0.03	
			Beryllium	--	--	--	--	--	GS	0.0004	--	--	0.0004	
			Cadmium	--	--	--	--	--	Kidney	0.007	--	0.003	0.010	
			Chromium VI	5E-06	--	--	--	5E-06	None Specified	0.007	--	--	0.007	
			Cobalt	--	--	--	--	--	Thyroid	0.02	--	--	0.02	
			Iron	--	--	--	--	--	GS	0.01	--	--	0.01	
			Lead	--	--	--	--	--	NA	--	--	--	--	
			Manganese	--	--	--	--	--	CNS	0.006	--	--	0.006	
			Chemical Total	6E-06	--	2E-06	--	8E-06		0.07	--	0.01	0.08	
		Exposure Point Total												
		Exposure Medium Total												
		Air	Former Building 234	Benzo(a)anthracene	--	3E-14	--	--	3E-14	NA	--	--	--	--
				Benzo(a)pyrene	--	3E-13	--	--	3E-13	NA	--	--	--	--
	Benzo(b)fluoranthene			--	4E-14	--	--	4E-14	NA	--	--	--	--	
	Chrysene			--	4E-15	--	--	4E-15	NA	--	--	--	--	
	Dibenzo(a,h)anthracene			--	6E-14	--	--	6E-14	NA	--	--	--	--	
	Indeno(1,2,3-cd)pyrene			--	2E-14	--	--	2E-14	NA	--	--	--	--	
Arsenic	--			2E-11	--	--	2E-11	Skin, CVS	--	0.000002	--	0.000002		
Beryllium	--			2E-12	--	--	2E-12	Respiratory	--	0.0000003	--	0.0000003		
Cadmium	--			7E-12	--	--	7E-12	Kidney, Respiratory	--	0.000001	--	0.000001		
Chromium VI	--			6E-09	--	--	6E-09	Respiratory	--	0.000002	--	0.000002		
Cobalt	--			5E-11	--	--	5E-11	Respiratory	--	0.000007	--	0.000007		
Iron	--			--	--	--	--	NA	--	--	--	--		
Lead	--			--	--	--	--	NA	--	--	--	--		
Manganese	--		--	--	--	--	CNS	--	0.00002	--	0.00002			
Chemical Total	--	6E-09	--	--	6E-09		--	0.00003	--	0.00003				
Exposure Point Total														
Exposure Medium Total														
Medium Total														
Receptor Total			Receptor Risk Total					Receptor HI Total						
			8E-06					0.08						

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	1E-08	--	7E-09	--	2E-08	NA	--	--	--	--
			Benzo(a)pyrene	1E-07	--	6E-08	--	2E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	2E-08	--	1E-08	--	3E-08	NA	--	--	--	--
			Chrysene	2E-10	--	8E-11	--	2E-10	NA	--	--	--	--
			Dibenzo(a,h)anthracene	2E-08	--	1E-08	--	4E-08	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	7E-09	--	4E-09	--	1E-08	NA	--	--	--	--
			Arsenic	1E-06	--	2E-07	--	2E-06	Skin, CVS	0.01	--	0.001	0.01
			Beryllium	--	--	--	--	--	GS	0.0003	--	--	0.0003
			Cadmium	--	--	--	--	--	Kidney	0.005	--	0.0004	0.005
			Chromium VI	2E-06	--	--	--	2E-06	None Specified	0.005	--	--	0.005
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01
			Iron	--	--	--	--	--	GS	0.009	--	--	0.009
			Lead	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	0.004	--	--	0.004
			Chemical Total	4E-06	--	3E-07	--	4E-06		0.05	--	0.002	0.05
		Exposure Point Total					4E-06					0.05	
	Exposure Medium Total							4E-06				0.05	
	Air	Former Building 234	Benzo(a)anthracene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Benzo(a)pyrene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Benzo(b)fluoranthene	--	3E-14	--	--	3E-14	NA	--	--	--	--
			Chrysene	--	3E-15	--	--	3E-15	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	4E-14	--	--	4E-14	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	1E-14	--	--	1E-14	NA	--	--	--	--
			Arsenic	--	4E-11	--	--	4E-11	Skin, CVS	--	0.000002	--	0.000002
			Beryllium	--	4E-12	--	--	4E-12	Respiratory	--	0.0000003	--	0.0000003
			Cadmium	--	1E-11	--	--	1E-11	Kidney, Respiratory	--	0.000001	--	0.000001
Chromium VI			--	4E-09	--	--	4E-09	Respiratory	--	0.000002	--	0.000002	
Cobalt	--	1E-10	--	--	1E-10	Respiratory	--	0.000007	--	0.000007			
Iron	--	--	--	--	--	NA	--	--	--	--			
Lead	--	--	--	--	--	NA	--	--	--	--			
Manganese	--	--	--	--	--	CNS	--	0.00002	--	0.00002			
Chemical Total	--	4E-09	--	--	4E-09		--	0.00003	--	0.00003			
Exposure Point Total					4E-09					0.00003			
Exposure Medium Total							4E-09				0.00003		
Medium Total							4E-06				0.05		
Receptor Total							4E-06				0.05		
							Receptor Risk Total	4E-06			Receptor HI Total	0.05	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient											
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total							
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	4E-08	--	8E-08	--	1E-07												
			Benzo(a)pyrene	3E-07	--	7E-07	--	1E-06												
			Benzo(b)fluoranthene	6E-08	--	1E-07	--	2E-07												
			Chrysene	5E-10	--	1E-09	--	2E-09												
			Dibenzo(a,h)anthracene	8E-08	--	2E-07	--	2E-07												
			Indeno(1,2,3-cd)pyrene	2E-08	--	5E-08	--	7E-08												
			Arsenic	2E-06	--	8E-07	--	3E-06												
			Beryllium	--	--	--	--	--												
			Cadmium	--	--	--	--	--												
			Chromium VI	7E-06	--	--	--	7E-06												
			Cobalt	--	--	--	--	--												
			Iron	--	--	--	--	--												
			Lead	--	--	--	--	--												
			Manganese	--	--	--	--	--												
			Chemical Total	1E-05	--	2E-06	--	1E-05												
			Exposure Point Total																	
			Exposure Medium Total																	
	Air	Former Building 234	Benzo(a)anthracene	--	5E-14	--	--	5E-14												
			Benzo(a)pyrene	--	5E-13	--	--	5E-13												
			Benzo(b)fluoranthene	--	7E-14	--	--	7E-14												
			Chrysene	--	6E-15	--	--	6E-15												
Dibenzo(a,h)anthracene			--	1E-13	--	--	1E-13													
Indeno(1,2,3-cd)pyrene			--	3E-14	--	--	3E-14													
Arsenic			--	7E-11	--	--	7E-11													
Beryllium			--	7E-12	--	--	7E-12													
Cadmium			--	2E-11	--	--	2E-11													
Chromium VI			--	1E-08	--	--	1E-08													
Cobalt			--	2E-10	--	--	2E-10													
Iron			--	--	--	--	--													
Lead			--	--	--	--	--													
Manganese			--	--	--	--	--													
Chemical Total			--	1E-08	--	--	1E-08													
Exposure Point Total																				
Exposure Medium Total																				
Medium Total																				
Receptor Total			Receptor Risk Total																	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	8E-08	--	7E-08	--	2E-07	NA	--	--	--	--	
			Benzo(a)pyrene	7E-07	--	6E-07	--	1E-06	NA	--	--	--	--	
			Benzo(b)fluoranthene	1E-07	--	1E-07	--	2E-07	NA	--	--	--	--	
			Chrysene	1E-09	--	9E-10	--	2E-09	NA	--	--	--	--	
			Dibenzo(a,h)anthracene	2E-07	--	1E-07	--	3E-07	NA	--	--	--	--	
			Indeno(1,2,3-cd)pyrene	5E-08	--	4E-08	--	9E-08	NA	--	--	--	--	
			Arsenic	9E-06	--	2E-06	--	1E-05	Skin, CVS	0.06	--	0.01	0.07	
			Beryllium	--	--	--	--	--	GS	0.002	--	--	0.002	
			Cadmium	--	--	--	--	--	Kidney	0.03	--	0.003	0.03	
			Chromium VI	1E-05	--	--	--	1E-05	None Specified	0.03	--	--	0.03	
			Cobalt	--	--	--	--	--	Thyroid	0.07	--	--	0.07	
			Iron	--	--	--	--	--	GS	0.04	--	--	0.04	
			Lead	--	--	--	--	--	NA	--	--	--	--	
			Manganese	--	--	--	--	--	CNS	0.02	--	--	0.02	
			Chemical Total	3E-05	--	3E-06	--	3E-05		0.2	--	0.01	0.3	
		Exposure Point Total												
		Exposure Medium Total												
	Air	Former Building 234	Benzo(a)anthracene	--	3E-13	--	--	3E-13	NA	--	--	--	--	
			Benzo(a)pyrene	--	2E-12	--	--	2E-12	NA	--	--	--	--	
			Benzo(b)fluoranthene	--	4E-13	--	--	4E-13	NA	--	--	--	--	
			Chrysene	--	3E-14	--	--	3E-14	NA	--	--	--	--	
			Dibenzo(a,h)anthracene	--	6E-13	--	--	6E-13	NA	--	--	--	--	
			Indeno(1,2,3-cd)pyrene	--	1E-13	--	--	1E-13	NA	--	--	--	--	
			Arsenic	--	6E-10	--	--	6E-10	Skin, CVS	--	0.00002	--	0.00002	
			Beryllium	--	6E-11	--	--	6E-11	Respiratory	--	0.000003	--	0.000003	
			Cadmium	--	2E-10	--	--	2E-10	Kidney, Respiratory	--	0.00001	--	0.00001	
			Chromium VI	--	5E-08	--	--	5E-08	Respiratory	--	0.00002	--	0.00002	
Cobalt			--	1E-09	--	--	1E-09	Respiratory	--	0.00007	--	0.00007		
Iron			--	--	--	--	--	NA	--	--	--	--		
Lead	--	--	--	--	--	NA	--	--	--	--				
Manganese	--	--	--	--	--	CNS	--	0.0002	--	0.0002				
Chemical Total	--	5E-08	--	--	5E-08		--	0.0003	--	0.0003				
Exposure Point Total														
Exposure Medium Total														
Medium Total														
Receptor Total			Receptor Risk Total					Receptor HI Total						
			3E-05					0.3						

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	2E-08	--	7E-08	--	1E-07	NA	--	--	--	--
			Benzo(a)pyrene	2E-07	--	6E-07	--	9E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	4E-08	--	1E-07	--	1E-07	NA	--	--	--	--
			Chrysene	3E-10	--	8E-10	--	1E-09	NA	--	--	--	--
			Dibenzo(a,h)anthracene	5E-08	--	1E-07	--	2E-07	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1E-08	--	4E-08	--	6E-08	NA	--	--	--	--
			Arsenic	9E-07	--	6E-07	--	2E-06	Skin, CVS	0.01	--	0.009	0.02
			Beryllium	--	--	--	--	--	GS	0.0005	--	--	0.0005
			Cadmium	--	--	--	--	--	Kidney	0.007	--	0.003	0.010
			Chromium VI	5E-06	--	--	--	5E-06	None Specified	0.008	--	--	0.008
			Cobalt	--	--	--	--	--	Thyroid	0.02	--	--	0.02
			Iron	--	--	--	--	--	GS	0.01	--	--	0.01
			Lead	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	0.005	--	--	0.005
			Chemical Total	6E-06	--	2E-06	--	8E-06		0.06	--	0.01	0.07
			Exposure Point Total					8E-06					0.07
			Exposure Medium Total							8E-06			
	Air	Former Building 234	Benzo(a)anthracene	--	3E-14	--	--	3E-14	NA	--	--	--	--
			Benzo(a)pyrene	--	3E-13	--	--	3E-13	NA	--	--	--	--
			Benzo(b)fluoranthene	--	4E-14	--	--	4E-14	NA	--	--	--	--
			Chrysene	--	3E-15	--	--	3E-15	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	6E-14	--	--	6E-14	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	2E-14	--	--	2E-14	NA	--	--	--	--
Arsenic			--	2E-11	--	--	2E-11	Skin, CVS	--	0.000002	--	0.000002	
Beryllium			--	2E-12	--	--	2E-12	Respiratory	--	0.0000003	--	0.0000003	
Cadmium			--	7E-12	--	--	7E-12	Kidney, Respiratory	--	0.000001	--	0.000001	
Chromium VI			--	7E-09	--	--	7E-09	Respiratory	--	0.000002	--	0.000002	
Cobalt			--	5E-11	--	--	5E-11	Respiratory	--	0.000006	--	0.000006	
Iron			--	--	--	--	--	NA	--	--	--	--	
Lead			--	--	--	--	--	NA	--	--	--	--	
Manganese			--	--	--	--	--	CNS	--	0.00002	--	0.00002	
Chemical Total			--	7E-09	--	--	7E-09		--	0.00003	--	0.00003	
Exposure Point Total						7E-09					0.00003		
Exposure Medium Total							7E-09				0.00003		
Medium Total							8E-06				0.07		

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	5E-08	--	1E-07	--	2E-07	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.003	--	--	0.003
			Arsenic	1E-06	--	9E-07	--	2E-06	Skin, CVS	0.02	--	0.01	0.03
			Chromium VI	1E-06	--	--	--	1E-06	None Specified	0.002	--	--	0.002
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01
			Iron	--	--	--	--	--	GS	0.01	--	--	0.01
			Manganese	--	--	--	--	--	CNS	0.007	--	--	0.007
			Chemical Total	3E-06	--	1E-06	--	4E-06		0.06	--	0.01	0.07
			Exposure Point Total					4E-06					0.07
			Exposure Medium Total					4E-06					0.07
	Air	Former Building 234	Benzo(a)pyrene	--	5E-14	--	--	5E-14	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.000005	--	0.000005
			Arsenic	--	3E-11	--	--	3E-11	Skin, CVS	--	0.000003	--	0.000003
			Chromium VI	--	2E-09	--	--	2E-09	Respiratory	--	0.0000005	--	0.0000005
			Cobalt	--	3E-11	--	--	3E-11	Respiratory	--	0.000004	--	0.000004
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.00003	--	0.00003
			Chemical Total	--	2E-09	--	--	2E-09		--	0.00004	--	0.00004
			Exposure Point Total					2E-09					0.00004
			Exposure Medium Total					2E-09					0.00004
Medium Total								4E-06				0.07	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	1E-08	--	6E-09	--	2E-08	NA	--	--	--	--	
			Benzo(a)pyrene	1E-07	--	5E-08	--	2E-07	NA	--	--	--	--	
			Benzo(b)fluoranthene	2E-08	--	9E-09	--	3E-08	NA	--	--	--	--	
			Chrysene	1E-10	--	7E-11	--	2E-10	NA	--	--	--	--	
			Dibenzo(a,h)anthracene	2E-08	--	1E-08	--	4E-08	NA	--	--	--	--	
			Indeno(1,2,3-cd)pyrene	7E-09	--	4E-09	--	1E-08	NA	--	--	--	--	
			Arsenic	1E-06	--	2E-07	--	1E-06	Skin, CVS	0.01	--	0.001	0.01	
			Beryllium	--	--	--	--	--	GS	0.0003	--	--	0.0003	
			Cadmium	--	--	--	--	--	Kidney	0.005	--	0.0004	0.005	
			Chromium VI	2E-06	--	--	--	2E-06	None Specified	0.006	--	--	0.006	
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01	
			Iron	--	--	--	--	--	GS	0.008	--	--	0.008	
			Lead	--	--	--	--	--	NA	--	--	--	--	
			Manganese	--	--	--	--	--	CNS	0.004	--	--	0.004	
			Chemical Total	4E-06	--	2E-07	--	4E-06		0.04	--	0.002	0.05	
		Exposure Point Total								0.05				
		Exposure Medium Total								0.05				
		Air	Former Building 234	Benzo(a)anthracene	--	2E-14	--	--	2E-14	NA	--	--	--	--
	Benzo(a)pyrene			--	2E-13	--	--	2E-13	NA	--	--	--	--	
	Benzo(b)fluoranthene			--	3E-14	--	--	3E-14	NA	--	--	--	--	
	Chrysene			--	2E-15	--	--	2E-15	NA	--	--	--	--	
	Dibenzo(a,h)anthracene			--	4E-14	--	--	4E-14	NA	--	--	--	--	
	Indeno(1,2,3-cd)pyrene			--	1E-14	--	--	1E-14	NA	--	--	--	--	
	Arsenic			--	4E-11	--	--	4E-11	Skin, CVS	--	0.000002	--	0.000002	
	Beryllium			--	5E-12	--	--	5E-12	Respiratory	--	0.000003	--	0.000003	
	Cadmium			--	1E-11	--	--	1E-11	Kidney, Respiratory	--	0.000001	--	0.000001	
	Chromium VI			--	4E-09	--	--	4E-09	Respiratory	--	0.000002	--	0.000002	
Cobalt	--			9E-11	--	--	9E-11	Respiratory	--	0.000006	--	0.000006		
Iron	--			--	--	--	--	NA	--	--	--	--		
Lead	--	--	--	--	--	NA	--	--	--	--				
Manganese	--	--	--	--	--	CNS	--	0.00002	--	0.00002				
Chemical Total			--	5E-09	--	--	5E-09		--	0.00003	--	0.00003		
Exposure Point Total								0.00003						
Exposure Medium Total								0.00003						

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	2E-08	--	1E-08	--	3E-08	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.002	--	--	0.002
			Arsenic	2E-06	--	2E-07	--	2E-06	Skin, CVS	0.01	--	0.002	0.02
			Chromium VI	7E-07	--	--	--	7E-07	None Specified	0.002	--	--	0.002
			Cobalt	--	--	--	--	--	Thyroid	0.008	--	--	0.008
			Iron	--	--	--	--	--	GS	0.008	--	--	0.008
			Manganese	--	--	--	--	--	CNS	0.005	--	--	0.005
			Chemical Total	3E-06	--	2E-07	--	3E-06		0.04	--	0.002	0.04
		Exposure Point Total					3E-06					0.04	
		Exposure Medium Total					3E-06					0.04	
	Air	Former Building 234	Benzo(a)pyrene	--	3E-14	--	--	3E-14	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.000005	--	0.000005
			Arsenic	--	6E-11	--	--	6E-11	Skin, CVS	--	0.000003	--	0.000003
			Chromium VI	--	1E-09	--	--	1E-09	Respiratory	--	0.000005	--	0.000005
			Cobalt	--	7E-11	--	--	7E-11	Respiratory	--	0.000004	--	0.000004
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.00003	--	0.00003
			Chemical Total	--	1E-09	--	--	1E-09		--	0.00004	--	0.00004
		Exposure Point Total					1E-09					0.00004	
		Exposure Medium Total					1E-09					0.00004	
Medium Total								3E-06				0.04	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	4E-08	--	8E-08	--	1E-07					
			Benzo(a)pyrene	3E-07	--	7E-07	--	1E-06					
			Benzo(b)fluoranthene	5E-08	--	1E-07	--	2E-07					
			Chrysene	4E-10	--	9E-10	--	1E-09					
			Dibenzo(a,h)anthracene	8E-08	--	2E-07	--	2E-07					
			Indeno(1,2,3-cd)pyrene	2E-08	--	5E-08	--	7E-08					
			Arsenic	2E-06	--	8E-07	--	3E-06					
			Beryllium	--	--	--	--	--					
			Cadmium	--	--	--	--	--					
			Chromium VI	8E-06	--	--	--	8E-06					
			Cobalt	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Lead	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Chemical Total	1E-05	--	2E-06	--	1E-05					
		Exposure Point Total						1E-05					
	Exposure Medium Total								1E-05				
	Air	Former Building 234	Benzo(a)anthracene	--	5E-14	--	--	5E-14					
			Benzo(a)pyrene	--	4E-13	--	--	4E-13					
			Benzo(b)fluoranthene	--	7E-14	--	--	7E-14					
			Chrysene	--	6E-15	--	--	6E-15					
Dibenzo(a,h)anthracene			--	1E-13	--	--	1E-13						
Indeno(1,2,3-cd)pyrene			--	3E-14	--	--	3E-14						
Arsenic			--	6E-11	--	--	6E-11						
Beryllium			--	7E-12	--	--	7E-12						
Cadmium			--	2E-11	--	--	2E-11						
Chromium VI			--	1E-08	--	--	1E-08						
Cobalt			--	1E-10	--	--	1E-10						
Iron			--	--	--	--	--						
Lead			--	--	--	--	--						
Manganese			--	--	--	--	--						
Chemical Total			--	1E-08	--	--	1E-08						
Exposure Point Total						1E-08							
Exposure Medium Total								1E-08					
Medium Total								1E-05					

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	7E-08	--	1E-07	--	2E-07					
			Aluminum	--	--	--	--	--					
			Arsenic	3E-06	--	1E-06	--	4E-06					
			Chromium VI	2E-06	--	--	--	2E-06					
			Cobalt	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
		Chemical Total		5E-06	--	1E-06	--	7E-06					
		Exposure Point Total						7E-06					
		Exposure Medium Total						7E-06					
	Air	Former Building 234	Benzo(a)pyrene	--	9E-14	--	--	9E-14					
			Aluminum	--	--	--	--	--					
			Arsenic	--	9E-11	--	--	9E-11					
			Chromium VI	--	3E-09	--	--	3E-09					
			Cobalt	--	1E-10	--	--	1E-10					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
		Chemical Total		--	3E-09	--	--	3E-09					
		Exposure Point Total						3E-09					
		Exposure Medium Total						3E-09					
	Medium Total							7E-06					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	8E-08	--	7E-08	--	1E-07	NA	--	--	--	--	
			Benzo(a)pyrene	7E-07	--	6E-07	--	1E-06	NA	--	--	--	--	
			Benzo(b)fluoranthene	1E-07	--	9E-08	--	2E-07	NA	--	--	--	--	
			Chrysene	9E-10	--	8E-10	--	2E-09	NA	--	--	--	--	
			Dibenzo(a,h)anthracene	2E-07	--	1E-07	--	3E-07	NA	--	--	--	--	
			Indeno(1,2,3-cd)pyrene	5E-08	--	4E-08	--	9E-08	NA	--	--	--	--	
			Arsenic	9E-06	--	2E-06	--	1E-05	Skin, CVS	0.05	--	0.01	0.06	
			Beryllium	--	--	--	--	--	GS	0.002	--	--	0.002	
			Cadmium	--	--	--	--	--	Kidney	0.03	--	0.003	0.03	
			Chromium VI	2E-05	--	--	--	2E-05	None Specified	0.03	--	--	0.03	
			Cobalt	--	--	--	--	--	Thyroid	0.06	--	--	0.06	
			Iron	--	--	--	--	--	GS	0.04	--	--	0.04	
			Lead	--	--	--	--	--	NA	--	--	--	--	
			Manganese	--	--	--	--	--	CNS	0.02	--	--	0.02	
			Chemical Total	3E-05	--	3E-06	--	3E-05		0.2	--	0.01	0.2	
		Exposure Point Total												
		Exposure Medium Total												
		Air	Former Building 234	Benzo(a)anthracene	--	2E-13	--	--	2E-13	NA	--	--	--	--
	Benzo(a)pyrene			--	2E-12	--	--	2E-12	NA	--	--	--	--	
	Benzo(b)fluoranthene			--	4E-13	--	--	4E-13	NA	--	--	--	--	
	Chrysene			--	3E-14	--	--	3E-14	NA	--	--	--	--	
	Dibenzo(a,h)anthracene			--	6E-13	--	--	6E-13	NA	--	--	--	--	
	Indeno(1,2,3-cd)pyrene			--	1E-13	--	--	1E-13	NA	--	--	--	--	
	Arsenic			--	5E-10	--	--	5E-10	Skin, CVS	--	0.00002	--	0.00002	
	Beryllium			--	6E-11	--	--	6E-11	Respiratory	--	0.000004	--	0.000004	
	Cadmium			--	2E-10	--	--	2E-10	Kidney, Respiratory	--	0.00001	--	0.00001	
	Chromium VI			--	6E-08	--	--	6E-08	Respiratory	--	0.00002	--	0.00002	
	Cobalt			--	1E-09	--	--	1E-09	Respiratory	--	0.00006	--	0.00006	
	Iron			--	--	--	--	--	NA	--	--	--	--	
	Lead			--	--	--	--	--	NA	--	--	--	--	
	Manganese			--	--	--	--	--	CNS	--	0.0002	--	0.0002	
	Chemical Total			--	6E-08	--	--	6E-08		--	0.0003	--	0.0003	
	Exposure Point Total													
	Exposure Medium Total													
	Medium Total													
	Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	1E-07	--	1E-07	--	3E-07	NA	--	--	--	--
Aluminum				--	--	--	--	--	CNS	0.01	--	--	0.01	
Arsenic				1E-05	--	2E-06	--	1E-05	Skin, CVS	0.08	--	0.02	0.09	
Chromium VI				4E-06	--	--	--	4E-06	None Specified	0.008	--	--	0.008	
Cobalt				--	--	--	--	--	Thyroid	0.04	--	--	0.04	
Iron				--	--	--	--	--	GS	0.04	--	--	0.04	
Manganese				--	--	--	--	--	CNS	0.03	--	--	0.03	
Chemical Total				2E-05	--	3E-06	--	2E-05		0.2	--	0.02	0.2	
Exposure Point Total														
Exposure Medium Total														

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Subsurface Soil	Air	Former Building 234	Benzo(a)pyrene	--	4E-13	--	--	4E-13	NA	--	--	--	--	
			Aluminum	--	--	--	--	--	CNS	--	0.00005	--	0.00005	
			Arsenic	--	7E-10	--	--	7E-10	Skin, CVS	--	0.00003	--	0.00003	
			Chromium VI	--	2E-08	--	--	2E-08	Respiratory	--	0.000005	--	0.000005	
			Cobalt	--	9E-10	--	--	9E-10	Respiratory	--	0.00005	--	0.00005	
			Iron	--	--	--	--	--	NA	--	--	--	--	
			Manganese	--	--	--	--	--	CNS	--	0.0003	--	0.0003	
			Chemical Total	--	2E-08	--	--	2E-08		--	0.0004	--	0.0004	
			Exposure Point Total					2E-08					0.0004	
		Exposure Medium Total								2E-08				0.0004
Medium Total								2E-05				0.2		
Groundwater	Groundwater	Former Building 234	cis-1,2-Dichloroethene	--	--	--	--	--	Kidney ne System, Development	0.06	--	0.0007	0.06	
			Trichloroethene	6E-07	--	1E-08	--	6E-07		0.08	--	0.001	0.08	
			Vinyl Chloride	7E-07	--	3E-09	--	7E-07		0.0009	--	0.000004	0.0009	
			Aluminum	--	--	--	--	--		0.0005	--	0.0000002	0.0005	
			Arsenic	7E-06	--	3E-09	--	7E-06		0.04	--	0.00002	0.04	
			Cobalt	--	--	--	--	--		0.06	--	0.00001	0.06	
			Iron	--	--	--	--	--		0.006	--	0.000003	0.006	
			Manganese	--	--	--	--	--		0.2	--	0.002	0.2	
			Chemical Total	8E-06	--	2E-08	--	8E-06			0.5	--	0.004	0.5
		Exposure Point Total					8E-06					0.5		
Exposure Medium Total								8E-06				0.5		
Medium Total								8E-06				0.5		
Receptor Total				Total Cancer Risk for Surface Soil and Groundwater					Total Hazard Index for Surface Soil and Groundwater					0.7
Receptor Total				Total Cancer Risk for Subsurface Soil and Groundwater					Total Hazard Index for Subsurface Soil and Groundwater					0.7

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	5E-09	--	2E-08	--	7E-09	NA	--	--	--	--
			Benzo(a)pyrene	5E-08	--	2E-08	--	7E-08	NA	--	--	--	--
			Benzo(b)fluoranthene	8E-09	--	3E-09	--	1E-08	NA	--	--	--	--
			Chrysene	6E-11	--	2E-11	--	9E-11	NA	--	--	--	--
			Dibenzo(a,h)anthracene	1E-08	--	4E-09	--	2E-08	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3E-09	--	1E-09	--	4E-09	NA	--	--	--	--
			Arsenic	6E-07	--	5E-08	--	6E-07	Skin, CVS	0.09	--	0.008	0.1
			Beryllium	--	--	--	--	--	GS	0.001	--	--	0.001
			Cadmium	--	--	--	--	--	Kidney	0.04	--	0.003	0.05
			Chromium VI	1E-06	--	--	--	1E-06	None Specified	0.008	--	--	0.008
			Cobalt	--	--	--	--	--	Thyroid	0.010	--	--	0.010
			Iron	--	--	--	--	--	GS	0.07	--	--	0.07
			Lead	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	0.03	--	--	0.03
			Chemical Total	2E-06	--	8E-08	--	2E-06		0.3	--	0.01	0.3
		Exposure Point Total					2E-06					0.3	
		Exposure Medium Total							2E-06				0.3
	Air	Former Building 234	Benzo(a)anthracene	--	4E-11	--	--	4E-11	NA	--	--	--	--
			Benzo(a)pyrene	--	4E-10	--	--	4E-10	NA	--	--	--	--
			Benzo(b)fluoranthene	--	6E-11	--	--	6E-11	NA	--	--	--	--
			Chrysene	--	5E-12	--	--	5E-12	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	9E-11	--	--	9E-11	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	2E-11	--	--	2E-11	NA	--	--	--	--
			Arsenic	--	9E-08	--	--	9E-08	Skin, CVS	--	0.09	--	0.09
			Beryllium	--	1E-08	--	--	1E-08	Respiratory	--	0.01	--	0.01
			Cadmium	--	3E-08	--	--	3E-08	Kidney, Respiratory	--	0.06	--	0.06
			Chromium VI	--	9E-06	--	--	9E-06	Respiratory	--	0.08	--	0.08
Cobalt			--	2E-07	--	--	2E-07	Respiratory	--	0.08	--	0.08	
Iron			--	--	--	--	--	NA	--	--	--	--	
Lead	--	--	--	--	--	NA	--	--	--	--			
Manganese	--	--	--	--	--	CNS	--	0.8	--	0.8			
Chemical Total	--	1E-05	--	--	1E-05		--	1	--	1			
Exposure Point Total					1E-05					1			
Exposure Medium Total							1E-05				1		
Medium Total							1E-05				1		
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	1E-08	--	4E-09	--	1E-08	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.02	--	--	0.02
			Arsenic	8E-07	--	8E-08	--	9E-07	Skin, CVS	0.1	--	0.01	0.1
			Chromium VI	3E-07	--	--	--	3E-07	None Specified	0.002	--	--	0.002
			Cobalt	--	--	--	--	--	Thyroid	0.007	--	--	0.007
			Iron	--	--	--	--	--	GS	0.08	--	--	0.08
			Manganese	--	--	--	--	--	CNS	0.05	--	--	0.05
			Chemical Total	1E-06	--	8E-08	--	1E-06		0.3	--	0.01	0.3
		Exposure Point Total					1E-06					0.3	
	Exposure Medium Total							1E-06				0.3	

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Subsurface Soil	Air	Former Building 234	Benzo(a)pyrene	--	7E-11	--	--	7E-11	NA	--	--	--	--	
			Aluminum	--	--	--	--	--	CNS	--	0.2	--	0.2	
			Arsenic	--	1E-07	--	--	1E-07	Skin, CVS	--	0.1	--	0.1	
			Chromium VI	--	3E-06	--	--	3E-06	Respiratory	--	0.02	--	0.02	
			Cobalt	--	1E-07	--	--	1E-07	Respiratory	--	0.06	--	0.06	
			Iron	--	--	--	--	--	NA	--	--	--	--	
			Manganese	--	--	--	--	--	CNS	--	1	--	1	
			Chemical Total	--	3E-06	--	--	3E-06		--	2	--	2	
			Exposure Point Total					3E-06					2	
		Exposure Medium Total					3E-06					2		
Medium Total								4E-06				2		
Groundwater	Groundwater	Former Building 234	cis-1,2-Dichloroethene	--	--	--	--	--	Kidney	0.0002	--	0.0010	0.001	
			Trichloroethene	7E-10	--	4E-09	--	5E-09	Liver, Kidney	0.002	--	0.01	0.02	
			Vinyl Chloride	7E-10	--	2E-09	--	3E-09	Liver	0.0002	--	0.0007	0.0009	
			Aluminum	--	--	--	--	--	CNS	0.00001	--	0.000007	0.00002	
			Arsenic	7E-09	--	4E-09	--	1E-08	Skin, CVS	0.001	--	0.0006	0.002	
			Cobalt	--	--	--	--	--	Thyroid	0.0001	--	0.00003	0.0002	
			Iron	--	--	--	--	--	GS	0.0002	--	0.00009	0.0003	
			Manganese	--	--	--	--	--	CNS	0.006	--	0.07	0.08	
			Chemical Total	9E-09	--	1E-08	--	2E-08		0.009	--	0.09	0.10	
			Exposure Point Total					2E-08					0.10	
			Exposure Medium Total					2E-08					0.10	
	Air	Former Building 234	cis-1,2-Dichloroethene	--	--	--	--	--	NA	--	--	--	--	
			Trichloroethene	--	9E-10	--	--	9E-10	Liver, Kidney	--	0.00003	--	0.00003	
			Vinyl Chloride	--	9E-11	--	--	9E-11	Liver	--	0.00002	--	0.00002	
			Aluminum	--	--	--	--	--	CNS	--	--	--	--	
			Arsenic	--	--	--	--	--	Skin, CVS	--	--	--	--	
			Cobalt	--	--	--	--	--	Respiratory	--	--	--	--	
			Iron	--	--	--	--	--	NA	--	--	--	--	
			Manganese	--	--	--	--	--	CNS	--	--	--	--	
			Chemical Total	--	1E-09	--	--	1E-09		--	0.00005	--	0.00005	
			Exposure Point Total					1E-09					0.00005	
			Exposure Medium Total					1E-09					0.00005	
Medium Total								2E-08				0.10		
Receptor Total				Total Cancer Risks for Surface Soil and Groundwater					Total Hazard Indices for Surface Soil and Groundwater					1
Receptor Total				Total Cancer Risks for Subsurface Soil and Groundwater					Total Hazard Indices for Subsurface Soil and Groundwater					2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organ HIs - Surface Soil and Groundwater

Total CNS HI	0.9
Total CVS HI	0.2
Total GS HI	0.07
Total Kidney HI	0.1
Total Liver HI	0.02
Total Respiratory HI	0.2
Total None Specified HI	0.008
Total Skin HI	0.2
Total Thyroid HI	0.01

Target Organ HIs - Subsurface Soil and Groundwater

Total CNS HI	2
Total CVS HI	0.3
Total GS HI	0.08
Total Kidney HI	0.02
Total Liver HI	0.02
Total Respiratory HI	0.08
Total None Specified HI	0.002
Total Skin HI	0.3
Total Thyroid HI	0.008

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	1E-06	--	5E-07	--	2E-06	NA	--	--	--	--	
			Benzo(a)pyrene	1E-05	--	4E-06	--	2E-05	NA	--	--	--	--	
			Benzo(b)fluoranthene	2E-06	--	7E-07	--	3E-06	NA	--	--	--	--	
			Chrysene	2E-08	--	6E-09	--	2E-08	NA	--	--	--	--	
			Dibenzo(a,h)anthracene	3E-06	--	1E-06	--	4E-06	NA	--	--	--	--	
			Indeno(1,2,3-cd)pyrene	8E-07	--	3E-07	--	1E-06	NA	--	--	--	--	
			Arsenic	3E-05	--	2E-06	--	3E-05	Skin, CVS	0.7	--	0.06	0.8	
			Beryllium	--	--	--	--	--	GS	0.02	--	--	0.02	
			Cadmium	--	--	--	--	--	Kidney	0.3	--	0.02	0.4	
			Chromium VI	3E-04	--	--	--	3E-04	None Specified	0.4	--	--	0.4	
			Cobalt	--	--	--	--	--	Thyroid	0.8	--	--	0.8	
			Iron	--	--	--	--	--	GS	0.5	--	--	0.5	
			Lead	--	--	--	--	--	NA	--	--	--	--	
			Manganese	--	--	--	--	--	CNS	0.3	--	--	0.3	
			Chemical Total	3E-04	--	9E-06	--	3E-04		3	--	0.08	3	
		Exposure Point Total												
		Exposure Medium Total												
	Air	Former Building 234	Benzo(a)anthracene	--	1E-12	--	--	1E-12	NA	--	--	--	--	
			Benzo(a)pyrene	--	1E-11	--	--	1E-11	NA	--	--	--	--	
			Benzo(b)fluoranthene	--	2E-12	--	--	2E-12	NA	--	--	--	--	
			Chrysene	--	2E-13	--	--	2E-13	NA	--	--	--	--	
			Dibenzo(a,h)anthracene	--	3E-12	--	--	3E-12	NA	--	--	--	--	
			Indeno(1,2,3-cd)pyrene	--	8E-13	--	--	8E-13	NA	--	--	--	--	
Arsenic			--	5E-10	--	--	5E-10	Skin, CVS	--	0.00010	--	0.00010		
Beryllium			--	6E-11	--	--	6E-11	Respiratory	--	0.00002	--	0.00002		
Cadmium			--	2E-10	--	--	2E-10	Kidney, Respiratory	--	0.00006	--	0.00006		
Chromium VI			--	3E-07	--	--	3E-07	Respiratory	--	0.00008	--	0.00008		
Cobalt			--	1E-09	--	--	1E-09	Respiratory	--	0.0003	--	0.0003		
Iron			--	--	--	--	--	NA	--	--	--	--		
Lead			--	--	--	--	--	NA	--	--	--	--		
Manganese			--	--	--	--	--	CNS	--	0.0008	--	0.0008		
Chemical Total			--	3E-07	--	--	3E-07		--	0.001	--	0.001		
Exposure Point Total														
Exposure Medium Total														
Medium Total														
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	2E-06	--	9E-07	--	3E-06	NA	--	--	--	--	
			Aluminum	--	--	--	--	--	CNS	0.2	--	--	0.2	
			Arsenic	4E-05	--	3E-06	--	4E-05	Skin, CVS	1.0	--	0.08	1	
			Chromium VI	7E-05	--	--	--	7E-05	None Specified	0.1	--	--	0.1	
			Cobalt	--	--	--	--	--	Thyroid	0.6	--	--	0.6	
			Iron	--	--	--	--	--	GS	0.6	--	--	0.6	
			Manganese	--	--	--	--	--	CNS	0.4	--	--	0.4	
		Chemical Total	1E-04	--	4E-06	--	1E-04		3	--	0.08	3		
	Exposure Point Total													
	Exposure Medium Total													

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	Former Building 234	Benzo(a)pyrene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.0002	--	0.0002
			Arsenic	--	7E-10	--	--	7E-10	Skin, CVS	--	0.0001	--	0.0001
			Chromium VI	--	9E-08	--	--	9E-08	Respiratory	--	0.00002	--	0.00002
			Cobalt	--	9E-10	--	--	9E-10	Respiratory	--	0.0002	--	0.0002
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.001	--	0.001
			Chemical Total	--	9E-08	--	--	9E-08		--	0.002	--	0.002
			Exposure Point Total										
		Exposure Medium Total											
Medium Total													
Groundwater	Groundwater	Former Building 234	cis-1,2-Dichloroethene	--	--	--	--	--	Kidney	0.4	--	0.05	0.5
			Trichloroethene (Mutagenic)	1E-06	--	2E-07	--	1E-06	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	8E-07	--	1E-07	--	9E-07	ne System, Developm	0.5	--	0.08	0.6
			Vinyl Chloride	1E-05	--	7E-07	--	1E-05	Liver	0.006	--	0.0003	0.006
			Aluminum	--	--	--	--	--	CNS	0.003	--	0.00002	0.003
			Arsenic	1E-05	--	7E-08	--	1E-05	Skin, CVS	0.3	--	0.002	0.3
			Cobalt	--	--	--	--	--	Thyroid	0.4	--	0.0010	0.4
			Iron	--	--	--	--	--	GS	0.04	--	0.0003	0.04
			Manganese	--	--	--	--	--	CNS	1	--	0.2	2
			Chemical Total	3E-05	--	1E-06	--	3E-05		3	--	0.4	3
			Exposure Point Total										
			Exposure Medium Total										
			Medium Total										
	Air	Former Building 234	cis-1,2-Dichloroethene	--	--	--	--	--	NA	--	--	--	--
			Trichloroethene (Mutagenic)	--	9E-07	--	--	9E-07	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	--	5E-07	--	--	5E-07	Liver, Kidney	--	0.9	--	0.9
			Vinyl Chloride	--	6E-07	--	--	6E-07	Liver	--	0.001	--	0.001
			Aluminum	--	--	--	--	--	CNS	--	--	--	--
			Arsenic	--	--	--	--	--	Skin, CVS	--	--	--	--
			Cobalt	--	--	--	--	--	Respiratory	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	--	--	--
			Chemical Total	--	2E-06	--	--	2E-06		--	0.9	--	0.9
			Exposure Point Total										
			Exposure Medium Total										
Medium Total													
Receptor Total	Total Cancer Risks for Surface Soil and Groundwater					Total Hazard Indices for Surface Soil and Groundwater							
Receptor Total	Total Cancer Risks for Subsurface Soil and Groundwater					Total Hazard Indices for Subsurface Soil and Groundwater							

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organ HIs - Surface Soil and Groundwater

Total CNS HI	2
Total CVS HI	1
Total Developmental HI	0.6
Total GS HI	0.6
Total Kidney HI	2
Total Liver HI	0.9
Total Respiratory HI	0.0004
Total None Specified HI	0.4

Target Organ HIs - Subsurface Soil and Groundwater

Total CNS HI	2
Total CVS HI	1
Total Developmental HI	0.6
Total GS HI	1
Total Kidney HI	1
Total Liver HI	0.9
Total Respiratory HI	0.0002
Total None Specified HI	0.1

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	2E-07	--	1E-07	--	3E-07	NA	--	--	--	--
			Benzo(a)pyrene	2E-06	--	9E-07	--	3E-06	NA	--	--	--	--
			Benzo(b)fluoranthene	3E-07	--	1E-07	--	4E-07	NA	--	--	--	--
			Chrysene	2E-09	--	1E-09	--	3E-09	NA	--	--	--	--
			Dibenzo(a,h)anthracene	4E-07	--	2E-07	--	6E-07	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1E-07	--	6E-08	--	2E-07	NA	--	--	--	--
			Arsenic	1E-05	--	1E-06	--	1E-05	Skin, CVS	0.07	--	0.009	0.08
			Beryllium	--	--	--	--	--	GS	0.002	--	--	0.002
			Cadmium	--	--	--	--	--	Kidney	0.04	--	0.003	0.04
			Chromium VI	4E-05	--	--	--	4E-05	None Specified	0.04	--	--	0.04
			Cobalt	--	--	--	--	--	Thyroid	0.08	--	--	0.08
			Iron	--	--	--	--	--	GS	0.06	--	--	0.06
			Lead	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	0.03	--	--	0.03
			Chemical Total	5E-05	--	3E-06	--	6E-05		0.3	--	0.01	0.3
		Exposure Point Total		6E-05					0.3				
	Exposure Medium Total		6E-05					0.3					
	Air	Former Building 234	Benzo(a)anthracene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Benzo(a)pyrene	--	2E-11	--	--	2E-11	NA	--	--	--	--
			Benzo(b)fluoranthene	--	3E-12	--	--	3E-12	NA	--	--	--	--
			Chrysene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	4E-12	--	--	4E-12	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Arsenic	--	2E-09	--	--	2E-09	Skin, CVS	--	0.00010	--	0.00010
			Beryllium	--	3E-10	--	--	3E-10	Respiratory	--	0.00002	--	0.00002
			Cadmium	--	7E-10	--	--	7E-10	Kidney, Respiratory	--	0.00006	--	0.00006
			Chromium VI	--	4E-07	--	--	4E-07	Respiratory	--	0.00008	--	0.00008
			Cobalt	--	5E-09	--	--	5E-09	Respiratory	--	0.0003	--	0.0003
			Iron	--	--	--	--	--	NA	--	--	--	--
			Lead	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.0008	--	0.0008
			Chemical Total	--	4E-07	--	--	4E-07		--	0.001	--	0.001
		Exposure Point Total		4E-07					0.001				
		Exposure Medium Total		4E-07					0.001				
Medium Total		6E-05					0.3						
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	3E-07	--	2E-07	--	5E-07	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.02	--	--	0.02
			Arsenic	2E-05	--	2E-06	--	2E-05	Skin, CVS	0.1	--	0.01	0.1
			Chromium VI	1E-05	--	--	--	1E-05	None Specified	0.01	--	--	0.01
			Cobalt	--	--	--	--	--	Thyroid	0.06	--	--	0.06
			Iron	--	--	--	--	--	GS	0.06	--	--	0.06
			Manganese	--	--	--	--	--	CNS	0.04	--	--	0.04
		Chemical Total	3E-05	--	2E-06	--	3E-05		0.3	--	0.01	0.3	
	Exposure Point Total		3E-05					0.3					
	Exposure Medium Total		3E-05					0.3					

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	Former Building 234	Benzo(a)pyrene	--	3E-12	--	--	3E-12	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.0002	--	0.0002
			Arsenic	--	3E-09	--	--	3E-09	Skin, CVS	--	0.0001	--	0.0001
			Chromium VI	--	1E-07	--	--	1E-07	Respiratory	--	0.00002	--	0.00002
			Cobalt	--	4E-09	--	--	4E-09	Respiratory	--	0.0002	--	0.0002
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.001	--	0.001
			Chemical Total	--	1E-07	--	--	1E-07		--	0.002	--	0.002
			Exposure Point Total					1E-07					0.002
		Exposure Medium Total					1E-07					0.002	
Medium Total								3E-05				0.3	
Groundwater	Groundwater	Former Building 234	cis-1,2-Dichloroethene	--	--	--	--	--	Kidney	0.2	--	0.02	0.2
			Trichloroethene (Mutagenic)	6E-07	--	1E-07	--	7E-07	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	1E-06	--	2E-07	--	2E-06	Immune System, Developmental	0.2	--	0.04	0.2
			Vinyl Chloride	2E-06	--	9E-08	--	2E-06	Liver	0.002	--	0.0001	0.003
			Aluminum	--	--	--	--	--	CNS	0.001	--	0.000008	0.001
			Arsenic	2E-05	--	1E-07	--	2E-05	Skin, CVS	0.1	--	0.0006	0.1
			Cobalt	--	--	--	--	--	Thyroid	0.2	--	0.0003	0.2
			Iron	--	--	--	--	--	GS	0.02	--	0.00009	0.02
			Manganese	--	--	--	--	--	CNS	0.6	--	0.08	0.7
			Chemical Total	2E-05	--	5E-07	--	2E-05		1	--	0.1	1
			Exposure Point Total					2E-05					1
			Exposure Medium Total					2E-05					1
	Air	Former Building 234	cis-1,2-Dichloroethene	--	--	--	--	--	NA	--	--	--	--
			Trichloroethene (Mutagenic)	--	1E-06	--	--	1E-06	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	--	2E-06	--	--	2E-06	Liver, Kidney	--	0.9	--	0.9
			Vinyl Chloride	--	2E-07	--	--	2E-07	Liver	--	0.001	--	0.001
			Aluminum	--	--	--	--	--	CNS	--	--	--	--
			Arsenic	--	--	--	--	--	Skin, CVS	--	--	--	--
			Cobalt	--	--	--	--	--	Respiratory	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	--	--	--
			Chemical Total	--	3E-06	--	--	3E-06		--	0.9	--	0.9
			Exposure Point Total					3E-06					0.9
			Exposure Medium Total					3E-06					0.9
Medium Total								3E-05				2	
Receptor Total				Total Cancer Risks for Surface Soil and Groundwater				8E-05	Total Hazard Indices for Surface Soil and Groundwater				3
Receptor Total				Total Cancer Risks for Subsurface Soil and Groundwater				6E-05	Total Hazard Indices for Subsurface Soil and Groundwater				3

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organ HIs - Surface Soil and Groundwater

Total CNS HI	0.7
Total CVS HI	0.2
Total Developmental HI	0.2
Total GS HI	0.08
Total Kidney HI	1
Total Liver HI	0.9
Total Respiratory HI	0.0004
Total None Specified HI	0.04
Total Skin HI	0.2
Total Thyroid HI	0.2

Target Organ HIs - Subsurface Soil and Groundwater

Total CNS HI	0.7
Total CVS HI	0.2
Total Developmental HI	0.2
Total GS HI	0.1
Total Kidney HI	1
Total Liver HI	0.9
Total Respiratory HI	0.0002
Total None Specified HI	0.01
Total Skin HI	0.2
Total Thyroid HI	0.2

TABLE 9.12.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient									
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total					
Surface Soil	Surface Soil	Former Building 234	Benzo(a)anthracene	1E-06	--	6E-07	--	2E-06										
			Benzo(a)pyrene	1E-05	--	5E-06	--	2E-05										
			Benzo(b)fluoranthene	2E-06	--	8E-07	--	3E-06										
			Chrysene	2E-08	--	7E-09	--	2E-08										
			Dibenzo(a,h)anthracene	3E-06	--	1E-06	--	4E-06										
			Indeno(1,2,3-cd)pyrene	9E-07	--	3E-07	--	1E-06										
			Arsenic	4E-05	--	4E-06	--	4E-05										
			Beryllium	--	--	--	--	--										
			Cadmium	--	--	--	--	--										
			Chromium VI	3E-04	--	--	--	3E-04										
			Cobalt	--	--	--	--	--										
			Iron	--	--	--	--	--										
			Lead	--	--	--	--	--										
			Manganese	--	--	--	--	--										
			Chemical Total	4E-04	--	1E-05	--	4E-04										
			Exposure Point Total											4E-04				
			Exposure Medium Total											4E-04				
	Air	Former Building 234	Benzo(a)anthracene	--	3E-12	--	--	3E-12										
			Benzo(a)pyrene	--	3E-11	--	--	3E-11										
			Benzo(b)fluoranthene	--	4E-12	--	--	4E-12										
			Chrysene	--	4E-13	--	--	4E-13										
			Dibenzo(a,h)anthracene	--	7E-12	--	--	7E-12										
			Indeno(1,2,3-cd)pyrene	--	2E-12	--	--	2E-12										
			Arsenic	--	3E-09	--	--	3E-09										
			Beryllium	--	3E-10	--	--	3E-10										
			Cadmium	--	9E-10	--	--	9E-10										
			Chromium VI	--	7E-07	--	--	7E-07										
Cobalt	--	6E-09	--	--	6E-09													
Iron	--	--	--	--	--													
Lead	--	--	--	--	--													
Manganese	--	--	--	--	--													
Chemical Total	--	7E-07	--	--	7E-07													
Exposure Point Total						7E-07												
Exposure Medium Total						7E-07												
Medium Total						4E-04												
Subsurface Soil	Subsurface Soil	Former Building 234	Benzo(a)pyrene	3E-06	--	1E-06	--	4E-06										
			Aluminum	--	--	--	--	--										
			Arsenic	5E-05	--	5E-06	--	6E-05										
			Chromium VI	9E-05	--	--	--	9E-05										
			Cobalt	--	--	--	--	--										
			Iron	--	--	--	--	--										
			Manganese	--	--	--	--	--										
			Chemical Total	1E-04	--	6E-06	--	1E-04										
			Exposure Point Total											1E-04				
			Exposure Medium Total											1E-04				

TABLE 9.12.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient									
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total					
Subsurface Soil	Air	Former Building 234	Benzo(a)pyrene	--	6E-12	--	--	6E-12										
			Aluminum	--	--	--	--	--										
			Arsenic	--	4E-09	--	--	4E-09										
			Chromium VI	--	2E-07	--	--	2E-07										
			Cobalt	--	4E-09	--	--	4E-09										
			Iron	--	--	--	--	--										
			Manganese	--	--	--	--	--										
			Chemical Total	--	2E-07	--	--	2E-07										
			Exposure Point Total											2E-07				
		Exposure Medium Total						2E-07										
Medium Total						1E-04												
Groundwater	Groundwater	Former Building 234	cis-1,2-Dichloroethene	--	--	--	--	--										
			Trichloroethene (Mutagenic)	2E-06	--	3E-07	--	2E-06										
			Trichloroethene (Nonmutagenic)	2E-06	--	4E-07	--	2E-06										
			Vinyl Chloride	2E-05	--	8E-07	--	2E-05										
			Aluminum	--	--	--	--	--										
			Arsenic	3E-05	--	2E-07	--	3E-05										
			Cobalt	--	--	--	--	--										
			Iron	--	--	--	--	--										
			Manganese	--	--	--	--	--										
		Chemical Total	5E-05	--	2E-06	--	5E-05											
		Exposure Point Total						5E-05										
		Exposure Medium Total						5E-05										
	Air	Former Building 234	cis-1,2 Dichloroethene	--	--	--	--	--										
			Trichloroethene (Mutagenic)	--	2E-06	--	--	2E-06										
			Trichloroethene (Nonmutagenic)	--	2E-06	--	--	2E-06										
			Vinyl Chloride	--	8E-07	--	--	8E-07										
			Aluminum	--	--	--	--	--										
			Arsenic	--	--	--	--	--										
			Cobalt	--	--	--	--	--										
			Iron	--	--	--	--	--										
			Manganese	--	--	--	--	--										
			Chemical Total	--	5E-06	--	--	5E-06										
			Exposure Point Total											5E-06				
			Exposure Medium Total											5E-06				
			Medium Total											6E-05				
Receptor Total	Total Cancer Risks for Surface Soil and Groundwater					4E-04												
Receptor Total	Total Cancer Risks for Subsurface Soil and Groundwater					2E-04												

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

South Waterfront

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SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

9.1.RME	Future Adolescent Trespassers - South Waterfront
9.2.RME	Future Adult Trespassers - South Waterfront
9.3.RME	Future Lifelong Trespassers - South Waterfront
9.4.RME	Future Industrial Workers - South Waterfront
9.5.RME	Current/Future Construction Workers - North Waterfront
9.6.RME	Hypothetical Child Residents - South Waterfront
9.7.RME	Hypothetical Adult Residents - South Waterfront
9.8.RME	Hypothetical Lifelong Residents - South Waterfront

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	South Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS None Specified Thyroid GS	0.004	--	--	0.004	
			Arsenic	1E-06	--	9E-07	--	2E-06		0.02	--	0.01	0.03	
			Chromium VI	1E-06	--	--	--	1E-06		0.002	--	--	0.002	
			Cobalt	--	--	--	--	--		0.02	--	--	0.02	
			Iron	--	--	--	--	--		0.02	--	--	0.02	
			Chemical Total	2E-06	--	9E-07	--	3E-06		0.06	--	0.01	0.08	
		Exposure Point Total												
		Exposure Medium Total												
	Air	South Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS Respiratory Respiratory NA	--	0.000006	--	0.000006	
			Arsenic	--	3E-11	--	--	3E-11		--	0.000003	--	0.000003	
			Chromium VI	--	1E-09	--	--	1E-09		--	0.0000004	--	0.0000004	
			Cobalt	--	6E-11	--	--	6E-11		--	0.000008	--	0.000008	
			Iron	--	--	--	--	--		--	--	--	--	
			Chemical Total	--	1E-09	--	--	1E-09		--	0.00002	--	0.00002	
		Exposure Point Total												
		Exposure Medium Total												
Medium Total														
Receptor Total			Receptor Risk Total					Receptor HI Total						

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum	--	--	--	--	--	CNS	0.003	--	--	0.003
			Arsenic	2E-06	--	2E-07	--	2E-06	Skin, CVS	0.01	--	0.002	0.02
			Chromium VI	5E-07	--	--	--	5E-07	None Specified	0.001	--	--	0.001
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01
			Iron	--	--	--	--	--	GS	0.01	--	--	0.01
		Chemical Total	2E-06	--	2E-07	--	3E-06		0.05	--	0.002	0.05	
		Exposure Point Total					3E-06					0.05	
		Exposure Medium Total					3E-06					0.05	
	Air	South Waterfront	Aluminum	--	--	--	--	--	CNS	--	0.000006	--	0.000006
			Arsenic	--	6E-11	--	--	6E-11	Skin, CVS	--	0.000003	--	0.000003
			Chromium VI	--	9E-10	--	--	9E-10	Respiratory	--	0.0000004	--	0.0000004
			Cobalt	--	1E-10	--	--	1E-10	Respiratory	--	0.000008	--	0.000008
			Iron	--	--	--	--	--	NA	--	--	--	--
		Chemical Total	--	1E-09	--	--	1E-09		--	0.00002	--	0.00002	
	Exposure Point Total					1E-09					0.00002		
	Exposure Medium Total					1E-09					0.00002		
Medium Total						3E-06					0.05		
Receptor Total						3E-06					0.05		
						Receptor Risk Total	3E-06				Receptor HI Total	0.05	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum	--	--	--	--	--					
			Arsenic	3E-06	--	1E-06	--	4E-06					
			Chromium VI	2E-06	--	--	--	2E-06					
			Cobalt	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Chemical Total	5E-06	--	1E-06	--	6E-06					
		Exposure Point Total					6E-06						
		Exposure Medium Total					6E-06						
	Air	South Waterfront	Aluminum	--	--	--	--	--					
			Arsenic	--	9E-11	--	--	9E-11					
			Chromium VI	--	2E-09	--	--	2E-09					
			Cobalt	--	2E-10	--	--	2E-10					
			Iron	--	--	--	--	--					
			Chemical Total	--	3E-09	--	--	3E-09					
		Exposure Point Total					3E-09						
		Exposure Medium Total					3E-09						
Medium Total								6E-06					
Receptor Total								6E-06					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum	--	--	--	--	--	CNS	0.02	--	--	0.02
			Arsenic	1E-05	--	2E-06	--	1E-05	Skin, CVS	0.08	--	0.02	0.09
			Chromium VI	3E-06	--	--	--	3E-06	None Specified	0.006	--	--	0.006
			Cobalt	--	--	--	--	--	Thyroid	0.08	--	--	0.08
			Iron	--	--	--	--	--	GS	0.06	--	--	0.06
			Chemical Total	2E-05	--	2E-06	--	2E-05		0.2	--	0.02	0.3
		Exposure Point Total	2E-05					0.3					
		Exposure Medium Total	2E-05					0.3					
	Air	South Waterfront	Aluminum	--	--	--	--	--	CNS	--	0.00007	--	0.00007
			Arsenic	--	8E-10	--	--	8E-10	Skin, CVS	--	0.00003	--	0.00003
			Chromium VI	--	1E-08	--	--	1E-08	Respiratory	--	0.000004	--	0.000004
			Cobalt	--	2E-09	--	--	2E-09	Respiratory	--	0.00008	--	0.00008
			Iron	--	--	--	--	--	NA	--	--	--	--
			Chemical Total	--	1E-08	--	--	1E-08		--	0.0002	--	0.0002
Exposure Point Total	1E-08					0.0002							
Exposure Medium Total	1E-08					0.0002							
Medium Total	2E-05					0.3							
Receptor Total	Receptor Risk Total					2E-05	Receptor HI Total					0.3	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum	--	--	--	--	--	CNS	0.03	--	--	0.03	
			Arsenic	9E-07	--	8E-08	--	9E-07	Skin, CVS	0.1	--	0.01	0.1	
			Chromium VI	2E-07	--	--	--	2E-07	None Specified	0.002	--	--	0.002	
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01	
			Iron	--	--	--	--	--	GS	0.1	--	--	0.1	
			Chemical Total	1E-06	--	8E-08	--	1E-06		0.3	--	0.01	0.3	
		Exposure Point Total								0.3				
		Exposure Medium Total								0.3				
	Air	South Waterfront	Aluminum	--	--	--	--	--	CNS	--	0.3	--	0.3	
			Arsenic	--	1E-07	--	--	1E-07	Skin, CVS	--	0.1	--	0.1	
			Chromium VI	--	2E-06	--	--	2E-06	Respiratory	--	0.02	--	0.02	
			Cobalt	--	3E-07	--	--	3E-07	Respiratory	--	0.1	--	0.1	
			Iron	--	--	--	--	--	NA	--	--	--	--	
			Chemical Total	--	2E-06	--	--	2E-06		--	0.5	--	0.5	
		Exposure Point Total								0.5				
		Exposure Medium Total								0.5				
Medium Total								0.8						
Receptor Total			Receptor Risk Total					Receptor HI Total						
			3E-06					0.8						
			3E-06					0.8						

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS None Specified Thyroid GS	0.2	--	--	0.2		
			Arsenic	4E-05	--	3E-06	--	4E-05		1	--	0.08	1		
			Chromium VI	6E-05	--	--	--	6E-05		0.08	--	--	0.08		
			Cobalt	--	--	--	--	--		1	--	--	1		
			Iron	--	--	--	--	--		0.8	--	--	0.8		
			Chemical Total	9E-05	--	3E-06	--	1E-04		3	--	0.08	3		
		Exposure Point Total						1E-04					3		
		Exposure Medium Total								1E-04					3
		Air	South Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS Respiratory Respiratory NA	--	0.0003	--	0.0003	
	Arsenic			--	8E-10	--	--	8E-10	--		0.0001	--	0.0001		
	Chromium VI			--	6E-08	--	--	6E-08	--		0.00002	--	0.00002		
	Cobalt			--	2E-09	--	--	2E-09	--		0.0003	--	0.0003		
	Iron			--	--	--	--	--	--		--	--	--		
	Chemical Total			--	7E-08	--	--	7E-08	--		0.0008	--	0.0008		
	Exposure Point Total							7E-08					0.0008		
	Exposure Medium Total								7E-08					0.0008	
									1E-04					3	
	Medium Total												3		
Receptor Total			Receptor Risk Total					1E-04	Receptor HI Total				3		

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CNS HI	0.2
Total CVS HI	1
Total GS HI	0.8
Total Respiratory HI	0.0004
Total None Specified HI	0.08
Total Skin HI	1
Total Thyroid HI	1

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum	--	--	--	--	--	CNS	0.02	--	--	0.02	
			Arsenic	2E-05	--	2E-06	--	2E-05	Skin, CVS	0.1	--	0.01	0.1	
			Chromium VI	8E-06	--	--	--	8E-06	None Specified	0.009	--	--	0.009	
			Cobalt	--	--	--	--	--	Thyroid	0.1	--	--	0.1	
			Iron	--	--	--	--	--	GS	0.08	--	--	0.08	
			Chemical Total	2E-05	--	2E-06	--	3E-05		0.3	--	0.01	0.3	
		Exposure Point Total												
		Exposure Medium Total												
		Air	South Waterfront	Aluminum	--	--	--	--	--	CNS	--	0.0003	--	0.0003
				Arsenic	--	3E-09	--	--	3E-09	Skin, CVS	--	0.0001	--	0.0001
	Chromium VI			--	9E-08	--	--	9E-08	Respiratory	--	0.00002	--	0.00002	
	Cobalt			--	6E-09	--	--	6E-09	Respiratory	--	0.0003	--	0.0003	
	Iron	--		--	--	--	--	NA	--	--	--	--		
	Chemical Total	--		1E-07	--	--	1E-07		--	0.0008	--	0.0008		
	Exposure Point Total													
	Exposure Medium Total													
	Medium Total													
	Receptor Total													

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Aluminum	--	--	--	--	--					
			Arsenic	6E-05	--	5E-06	--	6E-05					
			Chromium VI	6E-05	--	--	--	6E-05					
			Cobalt	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Chemical Total	1E-04	--	5E-06	--	1E-04					
		Exposure Point Total					1E-04						
		Exposure Medium Total					1E-04						
	Air	South Waterfront	Aluminum	--	--	--	--	--					
			Arsenic	--	4E-09	--	--	4E-09					
			Chromium VI	--	2E-07	--	--	2E-07					
			Cobalt	--	8E-09	--	--	8E-09					
			Iron	--	--	--	--	--					
			Chemical Total	--	2E-07	--	--	2E-07					
		Exposure Point Total					2E-07						
		Exposure Medium Total					2E-07						
Medium Total								1E-04					
Receptor Total								1E-04					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

PCB Removal Area

LIST OF TABLES
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SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

9.1.RME	Current Adolescent Trespassers - PCB Removal Area
9.2.RME	Current Adult Trespassers - PCB Removal Area
9.3.RME	Current Lifelong Trespassers - PCB Removal Area
9.4.RME	Current Industrial Workers - PCB Removal Area
9.5.RME	Future Adolescent Trespassers - PCB Removal Area
9.6.RME	Future Adult Trespassers - PCB Removal Area
9.7.RME	Future Lifelong Trespassers - PCB Removal Area
9.8.RME	Future Industrial Workers - PCB Removal Area
9.9.RME	Current/Future Construction Workers - North Waterfront
9.10.RME	Hypothetical Child Residents - PCB Removal Area
9.11.RME	Hypothetical Adult Residents - PCB Removal Area
9.12.RME	Hypothetical Lifelong Residents - PCB Removal Area

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCb Removal Area	Benzo(a)anthracene	1E-08	--	3E-08	--	4E-08	NA	--	--	--	--
			Benzo(a)pyrene	1E-07	--	3E-07	--	4E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	1E-08	--	4E-08	--	6E-08	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	Kidney	0.0000006	--	0.000002	0.000002
			Benzo(k)fluoranthene	7E-10	--	2E-09	--	3E-09	NA	--	--	--	--
			Chrysene	1E-10	--	3E-10	--	4E-10	NA	--	--	--	--
			Dibenzo(a,h)anthracene	1E-08	--	4E-08	--	6E-08	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	6E-09	--	2E-08	--	2E-08	NA	--	--	--	--
			Total Aroclors	2E-09	--	6E-09	--	7E-09	NA	--	--	--	--
			Arsenic	1E-06	--	8E-07	--	2E-06	Skin, CVS	0.02	--	0.01	0.03
			Cobalt	--	--	--	--	--	Thyroid	0.02	--	--	0.02
			Iron	--	--	--	--	--	GS	0.01	--	--	0.01
			Manganese	--	--	--	--	--	CNS	0.007	--	--	0.007
			Chemical Total	1E-06	--	1E-06	--	3E-06		0.06	--	0.01	0.07
			Exposure Point Total					3E-06					0.07
			Exposure Medium Total					3E-06					0.07
	Air	PCb Removal Area	Benzo(a)anthracene	--	1E-14	--	--	1E-14	NA	--	--	--	--
			Benzo(a)pyrene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Benzo(b)fluoranthene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	NA	--	--	--	--
			Benzo(k)fluoranthene	--	8E-15	--	--	8E-15	NA	--	--	--	--
			Chrysene	--	1E-15	--	--	1E-15	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	7E-15	--	--	7E-15	NA	--	--	--	--
			Total Aroclors	--	4E-15	--	--	4E-15	NA	--	--	--	--
			Arsenic	--	3E-11	--	--	3E-11	Skin, CVS	--	0.000003	--	0.000003
			Cobalt	--	6E-11	--	--	6E-11	Respiratory	--	0.000008	--	0.000008
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.00002	--	0.00002
			Chemical Total	--	8E-11	--	--	8E-11		--	0.00004	--	0.00004
			Exposure Point Total					8E-11					0.00004
			Exposure Medium Total					8E-11					0.00004
Medium Total								3E-06				0.07	
Receptor Total								3E-06				0.07	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DEREKTO SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	5E-09	--	3E-09	--	8E-09	NA	--	--	--	--
			Benzo(a)pyrene	5E-08	--	2E-08	--	7E-08	NA	--	--	--	--
			Benzo(b)fluoranthene	7E-09	--	4E-09	--	1E-08	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	Kidney	0.0000005	--	0.0000002	0.0000007
			Benzo(k)fluoranthene	3E-10	--	2E-10	--	5E-10	NA	--	--	--	--
			Chrysene	5E-11	--	3E-11	--	8E-11	NA	--	--	--	--
			Dibenzo(a,h)anthracene	7E-09	--	4E-09	--	1E-08	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3E-09	--	1E-09	--	4E-09	NA	--	--	--	--
			Total Aroclors	3E-09	--	1E-09	--	4E-09	NA	--	--	--	--
			Arsenic	2E-06	--	2E-07	--	2E-06	Skin, CVS	0.01	--	0.002	0.02
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01
			Iron	--	--	--	--	--	GS	0.008	--	--	0.008
			Manganese	--	--	--	--	--	CNS	0.005	--	--	0.005
			Chemical Total	2E-06	--	2E-07	--	2E-06		0.04	--	0.002	0.04
		Exposure Point Total					2E-06					0.04	
	Exposure Medium Total							2E-06				0.04	
	Air	PCB Removal Area	Benzo(a)anthracene	--	8E-15	--	--	8E-15	NA	--	--	--	--
			Benzo(a)pyrene	--	8E-14	--	--	8E-14	NA	--	--	--	--
			Benzo(b)fluoranthene	--	1E-14	--	--	1E-14	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	NA	--	--	--	--
			Benzo(k)fluoranthene	--	5E-15	--	--	5E-15	NA	--	--	--	--
			Chrysene	--	9E-16	--	--	9E-16	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	1E-14	--	--	1E-14	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	4E-15	--	--	4E-15	NA	--	--	--	--
			Total Aroclors	--	8E-15	--	--	8E-15	NA	--	--	--	--
			Arsenic	--	5E-11	--	--	5E-11	Skin, CVS	--	0.000003	--	0.000003
Cobalt		--	1E-10	--	--	1E-10	Respiratory	--	0.000008	--	0.000008		
Iron	--	--	--	--	--	NA	--	--	--	--			
Manganese	--	--	--	--	--	CNS	--	0.00002	--	0.00002			
Chemical Total	--	2E-10	--	--	2E-10		--	0.00004	--	0.00004			
Exposure Point Total					2E-10					0.00004			
Exposure Medium Total							2E-10				0.00004		
Medium Total							2E-06				0.04		
Receptor Total							Receptor Risk Total	2E-06			Receptor HI Total	0.04	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	2E-08	--	3E-08	--	5E-08					
			Benzo(a)pyrene	1E-07	--	3E-07	--	5E-07					
			Benzo(b)fluoranthene	2E-08	--	5E-08	--	7E-08					
			Benzo(g,h,i)perylene	--	--	--	--	--					
			Benzo(k)fluoranthene	1E-09	--	2E-09	--	3E-09					
			Chrysene	2E-10	--	4E-10	--	5E-10					
			Dibenzo(a,h)anthracene	2E-08	--	4E-08	--	7E-08					
			Indeno(1,2,3-cd)pyrene	9E-09	--	2E-08	--	3E-08					
			Total Aroclors	4E-09	--	7E-09	--	1E-08					
			Arsenic	3E-06	--	1E-06	--	4E-06					
			Cobalt	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Chemical Total	3E-06	--	1E-06	--	5E-06					
		Exposure Point Total					5E-06						
	Exposure Medium Total							5E-06					
	Air	PCB Removal Area	Benzo(a)anthracene	--	2E-14	--	--	2E-14					
			Benzo(a)pyrene	--	2E-13	--	--	2E-13					
			Benzo(b)fluoranthene	--	3E-14	--	--	3E-14					
			Benzo(g,h,i)perylene	--	--	--	--	--					
			Benzo(k)fluoranthene	--	1E-14	--	--	1E-14					
			Chrysene	--	2E-15	--	--	2E-15					
Dibenzo(a,h)anthracene			--	3E-14	--	--	3E-14						
Indeno(1,2,3-cd)pyrene			--	1E-14	--	--	1E-14						
Total Aroclors			--	1E-14	--	--	1E-14						
Arsenic			--	8E-11	--	--	8E-11						
Cobalt			--	2E-10	--	--	2E-10						
Iron			--	--	--	--	--						
Manganese			--	--	--	--	--						
Chemical Total			--	3E-10	--	--	3E-10						
Exposure Point Total						3E-10							
Exposure Medium Total							3E-10						
Medium Total							5E-06						
Receptor Total							5E-06						
							Receptor Risk Total					5E-06	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	3E-08	--	3E-08	--	6E-08	NA	--	--	--	--
			Benzo(a)pyrene	3E-07	--	3E-07	--	6E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	5E-08	--	4E-08	--	9E-08	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	Kidney	0.000002	--	0.000002	0.000004
			Benzo(k)fluoranthene	2E-09	--	2E-09	--	4E-09	NA	--	--	--	--
			Chrysene	4E-10	--	3E-10	--	7E-10	NA	--	--	--	--
			Dibenzo(a,h)anthracene	4E-08	--	4E-08	--	8E-08	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2E-08	--	2E-08	--	3E-08	NA	--	--	--	--
			Total Aroclors	2E-08	--	2E-08	--	3E-08	NA	--	--	--	--
			Arsenic	1E-05	--	2E-06	--	1E-05	Skin, CVS	0.07	--	0.01	0.08
			Cobalt	--	--	--	--	--	Thyroid	0.07	--	--	0.07
			Iron	--	--	--	--	--	GS	0.04	--	--	0.04
			Manganese	--	--	--	--	--	CNS	0.03	--	--	0.03
			Chemical Total	1E-05	--	3E-06	--	1E-05		0.2	--	0.01	0.2
		Exposure Point Total			1E-05					0.2			
	Exposure Medium Total			1E-05					0.2				
	Air	PCB Removal Area	Benzo(a)anthracene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Benzo(a)pyrene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Benzo(b)fluoranthene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	NA	--	--	--	--
			Benzo(k)fluoranthene	--	7E-14	--	--	7E-14	NA	--	--	--	--
			Chrysene	--	1E-14	--	--	1E-14	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	6E-14	--	--	6E-14	NA	--	--	--	--
			Total Aroclors	--	1E-13	--	--	1E-13	NA	--	--	--	--
Arsenic			--	7E-10	--	--	7E-10	Skin, CVS	--	0.00003	--	0.00003	
Cobalt	--	2E-09	--	--	2E-09	Respiratory	--	0.00008	--	0.00008			
Iron	--	--	--	--	--	NA	--	--	--	--			
Manganese	--	--	--	--	--	CNS	--	0.0003	--	0.0003			
Chemical Total	--	2E-09	--	--	2E-09		--	0.0004	--	0.0004			
Exposure Point Total			2E-09					0.0004					
Exposure Medium Total			2E-09					0.0004					
Medium Total			1E-05					0.2					
Receptor Total			Receptor Risk Total					Receptor HI Total					
			1E-05					0.2					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	5E-07	--	1E-06	--	2E-06	NA	--	--	--	--
			Benzo(a)pyrene	4E-06	--	1E-05	--	2E-05	NA	--	--	--	--
			Benzo(b)fluoranthene	6E-07	--	2E-06	--	2E-06	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	Kidney	0.00002	--	0.00005	0.00007
			Benzo(k)fluoranthene	2E-08	--	6E-08	--	8E-08	NA	--	--	--	--
			Chrysene	5E-09	--	1E-08	--	2E-08	NA	--	--	--	--
			Dibenzo(a,h)anthracene	7E-07	--	2E-06	--	3E-06	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2E-07	--	5E-07	--	7E-07	NA	--	--	--	--
			Total Aroclors	3E-08	--	1E-07	--	1E-07	NA	--	--	--	--
			Arsenic	1E-06	--	8E-07	--	2E-06	Skin, CVS	0.02	--	0.01	0.03
			Cobalt	--	--	--	--	--	Thyroid	0.02	--	--	0.02
			Iron	--	--	--	--	--	GS	0.01	--	--	0.01
			Manganese	--	--	--	--	--	CNS	0.007	--	--	0.007
			Chemical Total	7E-06	--	2E-05	--	3E-05		0.06	--	0.01	0.07
		Exposure Point Total					3E-05					0.07	
	Exposure Medium Total							3E-05				0.07	
	Air	PCB Removal Area	Benzo(a)anthracene	--	5E-13	--	--	5E-13	NA	--	--	--	--
			Benzo(a)pyrene	--	5E-12	--	--	5E-12	NA	--	--	--	--
			Benzo(b)fluoranthene	--	7E-13	--	--	7E-13	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	NA	--	--	--	--
			Benzo(k)fluoranthene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Chrysene	--	5E-14	--	--	5E-14	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	8E-13	--	--	8E-13	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Total Aroclors	--	7E-14	--	--	7E-14	NA	--	--	--	--
			Arsenic	--	3E-11	--	--	3E-11	Skin, CVS	--	0.000003	--	0.000003
Cobalt		--	6E-11	--	--	6E-11	Respiratory	--	0.000008	--	0.000008		
Iron	--	--	--	--	--	NA	--	--	--	--			
Manganese	--	--	--	--	--	CNS	--	0.00002	--	0.00002			
Chemical Total	--	9E-11	--	--	9E-11		--	0.00004	--	0.00004			
Exposure Point Total					9E-11					0.00004			
Exposure Medium Total							9E-11				0.00004		
Medium Total							3E-05				0.07		

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

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Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	1E-08	--	3E-08	--	5E-08	NA	--	--	--	--
			Benzo(a)pyrene	1E-07	--	4E-07	--	5E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	3E-08	--	8E-08	--	1E-07	NA	--	--	--	--
			Dibenzo(a,h)anthracene	4E-08	--	1E-07	--	1E-07	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.004	--	--	0.004
			Arsenic	2E-06	--	1E-06	--	3E-06	Skin, CVS	0.03	--	0.02	0.05
			Chromium VI	1E-06	--	--	--	1E-06	None Specified	0.002	--	--	0.002
			Cobalt	--	--	--	--	--	Thyroid	0.02	--	--	0.02
			Iron	--	--	--	--	--	GS	0.01	--	--	0.01
			Manganese	--	--	--	--	--	CNS	0.010	--	--	0.010
			Chemical Total	3E-06	--	2E-06	--	5E-06		0.08	--	0.02	0.10
		Exposure Point Total					5E-06					0.10	
		Exposure Medium Total					5E-06					0.10	
	Air	PCB Removal Area	Benzo(a)anthracene	--	1E-14	--	--	1E-14	NA	--	--	--	--
			Benzo(a)pyrene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Benzo(b)fluoranthene	--	3E-14	--	--	3E-14	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	5E-14	--	--	5E-14	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.000006	--	0.000006
			Arsenic	--	4E-11	--	--	4E-11	Skin, CVS	--	0.000005	--	0.000005
			Chromium VI	--	1E-09	--	--	1E-09	Respiratory	--	0.000004	--	0.000004
			Cobalt	--	5E-11	--	--	5E-11	Respiratory	--	0.000006	--	0.000006
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.00003	--	0.00003
			Chemical Total	--	1E-09	--	--	1E-09		--	0.00005	--	0.00005
		Exposure Point Total					1E-09					0.00005	
		Exposure Medium Total					1E-09					0.00005	
Medium Total					5E-06					0.10			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DEREKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	2E-07	--	1E-07	--	3E-07	NA	--	--	--	--
			Benzo(a)pyrene	2E-06	--	1E-06	--	3E-06	NA	--	--	--	--
			Benzo(b)fluoranthene	3E-07	--	1E-07	--	4E-07	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	Kidney	0.00001	--	0.000007	0.00002
			Benzo(k)fluoranthene	1E-08	--	5E-09	--	1E-08	NA	--	--	--	--
			Chrysene	2E-09	--	1E-09	--	3E-09	NA	--	--	--	--
			Dibenzo(a,h)anthracene	3E-07	--	2E-07	--	5E-07	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8E-08	--	4E-08	--	1E-07	NA	--	--	--	--
			Total Aroclors	4E-08	--	2E-08	--	7E-08	NA	--	--	--	--
			Arsenic	2E-06	--	2E-07	--	2E-06	Skin, CVS	0.01	--	0.002	0.02
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01
			Iron	--	--	--	--	--	GS	0.009	--	--	0.009
			Manganese	--	--	--	--	--	CNS	0.005	--	--	0.005
			Chemical Total	5E-06	--	2E-06	--	6E-06		0.04	--	0.002	0.04
		Exposure Point Total					6E-06					0.04	
	Exposure Medium Total							6E-06				0.04	
	Air	PCB Removal Area	Benzo(a)anthracene	--	4E-13	--	--	4E-13	NA	--	--	--	--
			Benzo(a)pyrene	--	3E-12	--	--	3E-12	NA	--	--	--	--
			Benzo(b)fluoranthene	--	4E-13	--	--	4E-13	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	NA	--	--	--	--
			Benzo(k)fluoranthene	--	2E-13	--	--	2E-13	NA	--	--	--	--
			Chrysene	--	4E-14	--	--	4E-14	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	6E-13	--	--	6E-13	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Total Aroclors	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Arsenic	--	5E-11	--	--	5E-11	Skin, CVS	--	0.000003	--	0.000003
			Cobalt	--	1E-10	--	--	1E-10	Respiratory	--	0.000008	--	0.000008
Iron		--	--	--	--	--	NA	--	--	--	--		
Manganese	--	--	--	--	--	CNS	--	0.00002	--	0.00002			
Chemical Total	--	2E-10	--	--	2E-10		--	0.00004	--	0.00004			
Exposure Point Total					2E-10					0.00004			
Exposure Medium Total							2E-10				0.00004		
Medium Total							6E-06				0.04		

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	6E-09	--	3E-09	--	9E-09	NA	--	--	--	--
			Benzo(a)pyrene	7E-08	--	3E-08	--	1E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	1E-08	--	7E-09	--	2E-08	NA	--	--	--	--
			Dibenzo(a,h)anthracene	2E-08	--	9E-09	--	3E-08	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.003	--	--	0.003
			Arsenic	3E-06	--	3E-07	--	3E-06	Skin, CVS	0.02	--	0.003	0.02
			Chromium VI	5E-07	--	--	--	5E-07	None Specified	0.001	--	--	0.001
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01
			Iron	--	--	--	--	--	GS	0.01	--	--	0.01
			Manganese	--	--	--	--	--	CNS	0.007	--	--	0.007
			Chemical Total	3E-06	--	4E-07	--	4E-06		0.05	--	0.003	0.06
		Exposure Point Total					4E-06					0.06	
		Exposure Medium Total					4E-06					0.06	
	Air	PCB Removal Area	Benzo(a)anthracene	--	9E-15	--	--	9E-15	NA	--	--	--	--
			Benzo(a)pyrene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Benzo(b)fluoranthene	--	2E-14	--	--	2E-14	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	3E-14	--	--	3E-14	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.000006	--	0.000006
			Arsenic	--	9E-11	--	--	9E-11	Skin, CVS	--	0.000005	--	0.000005
			Chromium VI	--	9E-10	--	--	9E-10	Respiratory	--	0.0000004	--	0.0000004
			Cobalt	--	1E-10	--	--	1E-10	Respiratory	--	0.000006	--	0.000006
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.00003	--	0.00003
			Chemical Total	--	1E-09	--	--	1E-09		--	0.00005	--	0.00005
		Exposure Point Total					1E-09					0.00005	
		Exposure Medium Total					1E-09					0.00005	
Medium Total					4E-06					0.06			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	7E-07	--	1E-06	--	2E-06					
			Benzo(a)pyrene	6E-06	--	1E-05	--	2E-05					
			Benzo(b)fluoranthene	9E-07	--	2E-06	--	3E-06					
			Benzo(g,h,i)perylene	--	--	--	--	--					
			Benzo(k)fluoranthene	3E-08	--	6E-08	--	9E-08					
			Chrysene	7E-09	--	1E-08	--	2E-08					
			Dibenzo(a,h)anthracene	1E-06	--	2E-06	--	3E-06					
			Indeno(1,2,3-cd)pyrene	3E-07	--	5E-07	--	8E-07					
			Total Aroclors	8E-08	--	1E-07	--	2E-07					
			Arsenic	3E-06	--	1E-06	--	4E-06					
			Cobalt	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Chemical Total	1E-05	--	2E-05	--	3E-05					
	Exposure Point Total												
	Exposure Medium Total												
	Air	PCB Removal Area	Benzo(a)anthracene	--	9E-13	--	--	9E-13					
			Benzo(a)pyrene	--	8E-12	--	--	8E-12					
			Benzo(b)fluoranthene	--	1E-12	--	--	1E-12					
			Benzo(g,h,i)perylene	--	--	--	--	--					
			Benzo(k)fluoranthene	--	4E-13	--	--	4E-13					
			Chrysene	--	9E-14	--	--	9E-14					
Dibenzo(a,h)anthracene			--	1E-12	--	--	1E-12						
Indeno(1,2,3-cd)pyrene			--	3E-13	--	--	3E-13						
Total Aroclors			--	2E-13	--	--	2E-13						
Arsenic			--	8E-11	--	--	8E-11						
Cobalt			--	2E-10	--	--	2E-10						
Iron			--	--	--	--	--						
Manganese			--	--	--	--	--						
Chemical Total			--	3E-10	--	--	3E-10						
Exposure Point Total													
Exposure Medium Total													
Medium Total													

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	2E-08	--	4E-08	--	6E-08					
			Benzo(a)pyrene	2E-07	--	4E-07	--	6E-07					
			Benzo(b)fluoranthene	4E-08	--	8E-08	--	1E-07					
			Dibenzo(a,h)anthracene	5E-08	--	1E-07	--	2E-07					
			Aluminum	--	--	--	--	--					
			Arsenic	5E-06	--	2E-06	--	6E-06					
			Chromium VI	2E-06	--	--	--	2E-06					
			Cobalt	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Chemical Total	7E-06	--	2E-06	--	9E-06					
		Exposure Point Total					9E-06						
		Exposure Medium Total					9E-06						
	Air	PCB Removal Area	Benzo(a)anthracene	--	2E-14	--	--	2E-14					
			Benzo(a)pyrene	--	3E-13	--	--	3E-13					
			Benzo(b)fluoranthene	--	5E-14	--	--	5E-14					
			Dibenzo(a,h)anthracene	--	8E-14	--	--	8E-14					
			Aluminum	--	--	--	--	--					
			Arsenic	--	1E-10	--	--	1E-10					
			Chromium VI	--	2E-09	--	--	2E-09					
			Cobalt	--	1E-10	--	--	1E-10					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Chemical Total	--	3E-09	--	--	3E-09					
		Exposure Point Total					3E-09						
		Exposure Medium Total					3E-09						
Medium Total								9E-06					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	1E-06	--	1E-06	--	3E-06	NA	--	--	--	--
			Benzo(a)pyrene	1E-05	--	1E-05	--	2E-05	NA	--	--	--	--
			Benzo(b)fluoranthene	2E-06	--	2E-06	--	3E-06	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	Kidney	0.00007	--	0.00006	0.0001
			Benzo(k)fluoranthene	6E-08	--	5E-08	--	1E-07	NA	--	--	--	--
			Chrysene	1E-08	--	1E-08	--	3E-08	NA	--	--	--	--
			Dibenzo(a,h)anthracene	2E-06	--	2E-06	--	4E-06	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	5E-07	--	5E-07	--	1E-06	NA	--	--	--	--
			Total Aroclors	3E-07	--	3E-07	--	6E-07	NA	--	--	--	--
			Arsenic	1E-05	--	2E-06	--	1E-05	Skin, CVS	0.07	--	0.01	0.09
			Cobalt	--	--	--	--	--	Thyroid	0.07	--	--	0.07
			Iron	--	--	--	--	--	GS	0.04	--	--	0.04
			Manganese	--	--	--	--	--	CNS	0.03	--	--	0.03
			Chemical Total	3E-05	--	2E-05	--	5E-05		0.2	--	0.01	0.2
		Exposure Point Total					5E-05					0.2	
	Exposure Medium Total							5E-05				0.2	
	Air	PCB Removal Area	Benzo(a)anthracene	--	5E-12	--	--	5E-12	NA	--	--	--	--
			Benzo(a)pyrene	--	4E-11	--	--	4E-11	NA	--	--	--	--
			Benzo(b)fluoranthene	--	6E-12	--	--	6E-12	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	NA	--	--	--	--
			Benzo(k)fluoranthene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Chrysene	--	5E-13	--	--	5E-13	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	7E-12	--	--	7E-12	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Total Aroclors	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Arsenic	--	7E-10	--	--	7E-10	Skin, CVS	--	0.00003	--	0.00003
Cobalt		--	2E-09	--	--	2E-09	Respiratory	--	0.00008	--	0.00008		
Iron	--	--	--	--	--	NA	--	--	--	--			
Manganese	--	--	--	--	--	CNS	--	0.0003	--	0.0003			
Chemical Total	--	2E-09	--	--	2E-09		--	0.0004	--	0.0004			
Exposure Point Total					2E-09					0.0004			
Exposure Medium Total							2E-09				0.0004		
Medium Total							5E-05				0.2		

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	4E-08	--	3E-08	--	7E-08	NA	--	--	--	--
			Benzo(a)pyrene	4E-07	--	4E-07	--	8E-07	NA	--	--	--	--
			Benzo(b)fluoranthene	8E-08	--	7E-08	--	2E-07	NA	--	--	--	--
			Dibenzo(a,h)anthracene	1E-07	--	1E-07	--	2E-07	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.02	--	--	0.02
			Arsenic	2E-05	--	4E-06	--	2E-05	Skin, CVS	0.1	--	0.02	0.1
			Chromium VI	3E-06	--	--	--	3E-06	None Specified	0.006	--	--	0.006
			Cobalt	--	--	--	--	--	Thyroid	0.06	--	--	0.06
			Iron	--	--	--	--	--	GS	0.05	--	--	0.05
			Manganese	--	--	--	--	--	CNS	0.04	--	--	0.04
			Chemical Total	2E-05	--	4E-06	--	3E-05		0.3	--	0.02	0.3
		Exposure Point Total					3E-05					0.3	
		Exposure Medium Total					3E-05					0.3	
	Air	PCB Removal Area	Benzo(a)anthracene	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Benzo(a)pyrene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Benzo(b)fluoranthene	--	3E-13	--	--	3E-13	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	4E-13	--	--	4E-13	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.00007	--	0.00007
			Arsenic	--	1E-09	--	--	1E-09	Skin, CVS	--	0.00005	--	0.00005
			Chromium VI	--	1E-08	--	--	1E-08	Respiratory	--	0.000004	--	0.000004
			Cobalt	--	1E-09	--	--	1E-09	Respiratory	--	0.00006	--	0.00006
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.0004	--	0.0004
			Chemical Total	--	1E-08	--	--	1E-08		--	0.0005	--	0.0005
		Exposure Point Total					1E-08					0.0005	
		Exposure Medium Total					1E-08					0.0005	
Medium Total					3E-05					0.3			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 2

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	1E-07	--	4E-08	--	1E-07	NA	--	--	--	--
			Benzo(a)pyrene	9E-07	--	3E-07	--	1E-06	NA	--	--	--	--
			Benzo(b)fluoranthene	1E-07	--	5E-08	--	2E-07	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	Kidney	0.0001	--	0.00005	0.0002
			Benzo(k)fluoranthene	4E-09	--	2E-09	--	6E-09	NA	--	--	--	--
			Chrysene	1E-09	--	4E-10	--	1E-09	NA	--	--	--	--
			Dibenzo(a,h)anthracene	1E-07	--	6E-08	--	2E-07	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	4E-08	--	1E-08	--	5E-08	NA	--	--	--	--
			Total Aroclors	2E-08	--	8E-09	--	3E-08	NA	--	--	--	--
			Arsenic	8E-07	--	7E-08	--	9E-07	Skin, CVS	0.1	--	0.01	0.1
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01
			Iron	--	--	--	--	--	GS	0.08	--	--	0.08
			Manganese	--	--	--	--	--	CNS	0.04	--	--	0.04
			Chemical Total	2E-06	--	5E-07	--	2E-06		0.2	--	0.01	0.2
	Exposure Point Total			2E-06					0.2				
	Exposure Medium Total			2E-06					0.2				
	Air	PCB Removal Area	Benzo(a)anthracene	--	8E-10	--	--	8E-10	NA	--	--	--	--
			Benzo(a)pyrene	--	7E-09	--	--	7E-09	NA	--	--	--	--
			Benzo(b)fluoranthene	--	1E-09	--	--	1E-09	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	NA	--	--	--	--
			Benzo(k)fluoranthene	--	3E-10	--	--	3E-10	NA	--	--	--	--
			Chrysene	--	7E-11	--	--	7E-11	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	1E-09	--	--	1E-09	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	3E-10	--	--	3E-10	NA	--	--	--	--
			Total Aroclors	--	3E-10	--	--	3E-10	NA	--	--	--	--
			Arsenic	--	1E-07	--	--	1E-07	Skin, CVS	--	0.1	--	0.1
Cobalt			--	2E-07	--	--	2E-07	Respiratory	--	0.1	--	0.1	
Iron			--	--	--	--	--	NA	--	--	--	--	
Manganese			--	--	--	--	--	CNS	--	1	--	1	
Chemical Total			--	3E-07	--	--	3E-07		--	1	--	1	
Exposure Point Total			3E-07					1					
Exposure Medium Total			3E-07					1					
Medium Total			2E-06					1					

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 2

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	3E-09	--	1E-09	--	4E-09	NA	--	--	--	--
			Benzo(a)pyrene	3E-08	--	1E-08	--	4E-08	NA	--	--	--	--
			Benzo(b)fluoranthene	6E-09	--	2E-09	--	8E-09	NA	--	--	--	--
			Dibenzo(a,h)anthracene	8E-09	--	3E-09	--	1E-08	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.03	--	--	0.03
			Arsenic	1E-06	--	1E-07	--	1E-06	Skin, CVS	0.2	--	0.02	0.2
			Chromium VI	2E-07	--	--	--	2E-07	None Specified	--	--	--	--
			Cobalt	--	--	--	--	--	Thyroid	0.01	--	--	0.01
			Iron	--	--	--	--	--	GS	0.09	--	--	0.09
			Manganese	--	--	--	--	--	CNS	0.06	--	--	0.06
			Chemical Total	1E-06	--	1E-07	--	1E-06		0.4	--	0.02	0.4
		Exposure Point Total		1E-06					0.4				
	Exposure Medium Total		1E-06					0.4					
	Air	PCB Removal Area	Benzo(a)anthracene	--	2E-11	--	--	2E-11	NA	--	--	--	--
			Benzo(a)pyrene	--	2E-10	--	--	2E-10	NA	--	--	--	--
			Benzo(b)fluoranthene	--	4E-11	--	--	4E-11	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	6E-11	--	--	6E-11	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.3	--	0.3
			Arsenic	--	2E-07	--	--	2E-07	Skin, CVS	--	0.2	--	0.2
			Chromium VI	--	2E-06	--	--	2E-06	Respiratory	--	0.02	--	0.02
			Cobalt	--	2E-07	--	--	2E-07	Respiratory	--	0.08	--	0.08
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	1	--	1
			Chemical Total	--	2E-06	--	--	2E-06		--	2	--	2
		Exposure Point Total		2E-06					2				
		Exposure Medium Total		2E-06					2				
Medium Total			3E-06					2					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organ HI - Subsurface Soil	
Total CNS HI	1
Total CVS HI	0.4
Total GS HI	0.1
Total Respiratory HI	0.1
Total Skin HI	0.4
Total Thyroid HI	0.01

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	2E-05	--	9E-06	--	3E-05	NA	--	--	--	--
			Benzo(a)pyrene	2E-04	--	8E-05	--	3E-04	NA	--	--	--	--
			Benzo(b)fluoranthene	3E-05	--	1E-05	--	4E-05	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	Kidney	0.0009	--	0.0003	0.001
			Benzo(k)fluoranthene	1E-06	--	4E-07	--	1E-06	NA	--	--	--	--
			Chrysene	2E-07	--	9E-08	--	3E-07	NA	--	--	--	--
			Dibenzo(a,h)anthracene	3E-05	--	1E-05	--	5E-05	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	9E-06	--	3E-06	--	1E-05	NA	--	--	--	--
			Total Aroclors	9E-07	--	4E-07	--	1E-06	NA	--	--	--	--
			Arsenic	4E-05	--	3E-06	--	4E-05	Skin, CVS	0.9	--	0.08	1
			Cobalt	--	--	--	--	--	Thyroid	1.0	--	--	1.0
			Iron	--	--	--	--	--	GS	0.6	--	--	0.6
			Manganese	--	--	--	--	--	CNS	0.3	--	--	0.3
			Chemical Total	3E-04	--	1E-04	--	5E-04		3	--	0.08	3
		Exposure Point Total					5E-04					3	
	Exposure Medium Total							5E-04				3	
	Air	PCB Removal Area	Benzo(a)anthracene	--	3E-11	--	--	3E-11	NA	--	--	--	--
			Benzo(a)pyrene	--	2E-10	--	--	2E-10	NA	--	--	--	--
			Benzo(b)fluoranthene	--	3E-11	--	--	3E-11	NA	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	NA	--	--	--	--
			Benzo(k)fluoranthene	--	1E-11	--	--	1E-11	NA	--	--	--	--
			Chrysene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	4E-11	--	--	4E-11	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	9E-12	--	--	9E-12	NA	--	--	--	--
			Total Aroclors	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Arsenic	--	7E-10	--	--	7E-10	Skin, CVS	--	0.0001	--	0.0001
Cobalt		--	2E-09	--	--	2E-09	Respiratory	--	0.0003	--	0.0003		
Iron	--	--	--	--	--	NA	--	--	--	--			
Manganese	--	--	--	--	--	CNS	--	0.001	--	0.001			
Chemical Total	--	3E-09	--	--	3E-09		--	0.002	--	0.002			
Exposure Point Total					3E-09					0.002			
Exposure Medium Total							3E-09				0.002		
Medium Total							5E-04				3		

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	6E-07	--	2E-07	--	8E-07	NA	--	--	--	--
			Benzo(a)pyrene	7E-06	--	3E-06	--	1E-05	NA	--	--	--	--
			Benzo(b)fluoranthene	1E-06	--	5E-07	--	2E-06	NA	--	--	--	--
			Dibenzo(a,h)anthracene	2E-06	--	7E-07	--	3E-06	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.2	--	--	0.2
			Arsenic	6E-05	--	5E-06	--	6E-05	Skin, CVS	1	--	0.1	2
			Chromium VI	6E-05	--	--	--	6E-05	None Specified	0.08	--	--	0.08
			Cobalt	--	--	--	--	--	Thyroid	0.8	--	--	0.8
			Iron	--	--	--	--	--	GS	0.7	--	--	0.7
			Manganese	--	--	--	--	--	CNS	0.5	--	--	0.5
			Chemical Total	1E-04	--	9E-06	--	1E-04		4	--	0.1	4
		Exposure Point Total					1E-04					4	
		Exposure Medium Total					1E-04					4	
	Air	PCB Removal Area	Benzo(a)anthracene	--	6E-13	--	--	6E-13	NA	--	--	--	--
			Benzo(a)pyrene	--	7E-12	--	--	7E-12	NA	--	--	--	--
			Benzo(b)fluoranthene	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.0003	--	0.0003
			Arsenic	--	1E-09	--	--	1E-09	Skin, CVS	--	0.0002	--	0.0002
			Chromium VI	--	6E-08	--	--	6E-08	Respiratory	--	0.00002	--	0.00002
			Cobalt	--	1E-09	--	--	1E-09	Respiratory	--	0.0003	--	0.0003
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.002	--	0.002
			Chemical Total	--	7E-08	--	--	7E-08		--	0.002	--	0.002
		Exposure Point Total					7E-08					0.002	
		Exposure Medium Total					7E-08					0.002	
Medium Total					1E-04					4			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Target Organ HIs			
Surface Soil		Subsurface Soil	
Total CNS HI	0.3	Total CNS HI	0.7
Total CVS HI	1	Total CVS HI	2
Total GS HI	0.6	Total GS HI	0.7
Total Kidney HI	0.001	Total Respiratory HI	0.0003
Total Respiratory HI	0.0003	Total None Specified HI	0.08
Total Skin HI	1	Total Skin HI	2
Total Thyroid HI	1	Total Thyroid HI	0.8

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Surface Soil	Surface Soil	PCB Removal Area	Benzo(a)anthracene	4E-06	--	2E-06	--	5E-06	NA	--	--	--	--		
			Benzo(a)pyrene	3E-05	--	2E-05	--	5E-05	NA	--	--	--	--		
			Benzo(b)fluoranthene	4E-06	--	2E-06	--	7E-06	NA	--	--	--	--		
			Benzo(g,h,i)perylene	--	--	--	--	--	Kidney	0.00009	--	0.00005	0.0001		
			Benzo(k)fluoranthene	2E-07	--	8E-08	--	2E-07	NA	--	--	--	--		
			Chrysene	4E-08	--	2E-08	--	5E-08	NA	--	--	--	--		
			Dibenzo(a,h)anthracene	5E-06	--	3E-06	--	8E-06	NA	--	--	--	--		
			Indeno(1,2,3-cd)pyrene	1E-06	--	7E-07	--	2E-06	NA	--	--	--	--		
			Total Aroclors	4E-07	--	2E-07	--	6E-07	NA	--	--	--	--		
			Arsenic	2E-05	--	2E-06	--	2E-05	Skin, CVS	0.10	--	0.01	0.1		
			Cobalt	--	--	--	--	--	Thyroid	0.1	--	--	0.1		
			Iron	--	--	--	--	--	GS	0.06	--	--	0.06		
			Manganese	--	--	--	--	--	CNS	0.04	--	--	0.04		
			Chemical Total	6E-05	--	3E-05	--	9E-05		0.3	--	0.01	0.3		
			Exposure Point Total			9E-05					0.3				
			Exposure Medium Total			9E-05					0.3				
	Air	PCB Removal Area	Benzo(a)anthracene	--	3E-11	--	--	3E-11	NA	--	--	--	--		
			Benzo(a)pyrene	--	3E-10	--	--	3E-10	NA	--	--	--	--		
			Benzo(b)fluoranthene	--	4E-11	--	--	4E-11	NA	--	--	--	--		
			Benzo(g,h,i)perylene	--	--	--	--	--	NA	--	--	--	--		
			Benzo(k)fluoranthene	--	1E-11	--	--	1E-11	NA	--	--	--	--		
			Chrysene	--	3E-12	--	--	3E-12	NA	--	--	--	--		
			Dibenzo(a,h)anthracene	--	5E-11	--	--	5E-11	NA	--	--	--	--		
			Indeno(1,2,3-cd)pyrene	--	1E-11	--	--	1E-11	NA	--	--	--	--		
			Total Aroclors	--	7E-12	--	--	7E-12	NA	--	--	--	--		
			Arsenic	--	3E-09	--	--	3E-09	Skin, CVS	--	0.0001	--	0.0001		
			Cobalt	--	6E-09	--	--	6E-09	Respiratory	--	0.0003	--	0.0003		
			Iron	--	--	--	--	--	NA	--	--	--	--		
			Manganese	--	--	--	--	--	CNS	--	0.001	--	0.001		
			Chemical Total	--	9E-09	--	--	9E-09		--	0.002	--	0.002		
			Exposure Point Total			9E-09					0.002				
			Exposure Medium Total			9E-09					0.002				
Medium Total			9E-05					0.3							

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	PCB Removal Area	Benzo(a)anthracene	9E-08	--	5E-08	--	1E-07	NA	--	--	--	--
			Benzo(a)pyrene	1E-06	--	5E-07	--	2E-06	NA	--	--	--	--
			Benzo(b)fluoranthene	2E-07	--	1E-07	--	3E-07	NA	--	--	--	--
			Dibenzo(a,h)anthracene	3E-07	--	1E-07	--	4E-07	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	0.02	--	--	0.02
			Arsenic	2E-05	--	3E-06	--	3E-05	Skin, CVS	0.2	--	0.02	0.2
			Chromium VI	8E-06	--	--	--	8E-06	None Specified	0.009	--	--	0.009
			Cobalt	--	--	--	--	--	Thyroid	0.09	--	--	0.09
			Iron	--	--	--	--	--	GS	0.07	--	--	0.07
			Manganese	--	--	--	--	--	CNS	0.05	--	--	0.05
			Chemical Total	3E-05	--	4E-06	--	4E-05		0.4	--	0.02	0.4
		Exposure Point Total					4E-05					0.4	
		Exposure Medium Total					4E-05					0.4	
	Air	PCB Removal Area	Benzo(a)anthracene	--	9E-13	--	--	9E-13	NA	--	--	--	--
			Benzo(a)pyrene	--	1E-11	--	--	1E-11	NA	--	--	--	--
			Benzo(b)fluoranthene	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	3E-12	--	--	3E-12	NA	--	--	--	--
			Aluminum	--	--	--	--	--	CNS	--	0.0003	--	0.0003
			Arsenic	--	4E-09	--	--	4E-09	Skin, CVS	--	0.0002	--	0.0002
			Chromium VI	--	9E-08	--	--	9E-08	Respiratory	--	0.00002	--	0.00002
			Cobalt	--	5E-09	--	--	5E-09	Respiratory	--	0.0003	--	0.0003
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	CNS	--	0.002	--	0.002
			Chemical Total	--	1E-07	--	--	1E-07		--	0.002	--	0.002
		Exposure Point Total					1E-07					0.002	
		Exposure Medium Total					1E-07					0.002	
Medium Total					4E-05					0.4			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

APPENDIX F.3

PROUCL OUTPUTS

North Waterfront
Unpaved Surface Soil

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

	General UCL Statistics for Data Sets with Non-Detects		
User Selected Options			
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Unpaved Surface Soil - North W		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
BENZO(A)ANTHRACENE			
General Statistics			
Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	6
		Percent Non-Detects	75.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	31.8	Minimum Detected	3.459
Maximum Detected	232	Maximum Detected	5.447
Mean of Detected	131.9	Mean of Detected	4.453
SD of Detected	141.6	SD of Detected	1.405
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	410	Maximum Non-Detect	6.016
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	165.5	Mean	4.992
SD	58.71	SD	0.63
95% DL/2 (t) UCL	204.8	95% H-Stat (DL/2) UCL	333
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

BENZO(A)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	131.9
5% K-S Critical Value	N/A	SD	100.1
Data not Gamma Distributed at 5% Significance Level		SE of Mean	100.1
		95% KM (t) UCL	321.5
Assuming Gamma Distribution		95% KM (z) UCL	296.5
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	382.8
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	232
Mean	N/A	95% KM (Percentile Bootstrap) UCL	232
Median	N/A	95% KM (Chebyshev) UCL	568.2
SD	N/A	97.5% KM (Chebyshev) UCL	757
k star	N/A	99% KM (Chebyshev) UCL	1128
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (BCA) UCL	232
95% Gamma Approximate UCL (Use when n >= 40)	N/A		
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

BENZO(A)PYRENE			
General Statistics			
Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	6
		Percent Non-Detects	75.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	29.6	Minimum Detected	3.388
Maximum Detected	165	Maximum Detected	5.106
Mean of Detected	97.3	Mean of Detected	4.247
SD of Detected	95.74	SD of Detected	1.215
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	410	Maximum Non-Detect	6.016
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	156.8	Mean	4.94
SD	53.05	SD	0.631
95% DL/2 (t) UCL	192.4	95% H-Stat (DL/2) UCL	317
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

BENZO(A)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	97.3
5% K-S Critical Value	N/A	SD	67.7
Data not Gamma Distributed at 5% Significance Level		SE of Mean	67.7
		95% KM (t) UCL	225.6
Assuming Gamma Distribution		95% KM (z) UCL	208.7
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	267
Minimum	N/A	95% KM (bootstrap t) UCL	198.9
Maximum	N/A	95% KM (BCA) UCL	165
Mean	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Median	N/A	95% KM (Chebyshev) UCL	392.4
SD	N/A	97.5% KM (Chebyshev) UCL	520.1
k star	N/A	99% KM (Chebyshev) UCL	770.9
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (BCA) UCL	165
95% Gamma Approximate UCL (Use when n >= 40)	N/A		
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

BENZO(B)FLUORANTHENE			
General Statistics			
Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	6
		Percent Non-Detects	75.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	54	Minimum Detected	3.989
Maximum Detected	263	Maximum Detected	5.572
Mean of Detected	158.5	Mean of Detected	4.781
SD of Detected	147.8	SD of Detected	1.119
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	410	Maximum Non-Detect	6.016
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	172.1	Mean	5.074
SD	57.84	SD	0.465
95% DL/2 (t) UCL	210.9	95% H-Stat (DL/2) UCL	266.6
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

BENZO(B)FLUORANTHENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	158.5
5% K-S Critical Value	N/A	SD	104.5
Data not Gamma Distributed at 5% Significance Level		SE of Mean	104.5
		95% KM (t) UCL	356.5
Assuming Gamma Distribution		95% KM (z) UCL	330.4
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	420.4
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	263
Mean	N/A	95% KM (Percentile Bootstrap) UCL	263
Median	N/A	95% KM (Chebyshev) UCL	614
SD	N/A	97.5% KM (Chebyshev) UCL	811.1
k star	N/A	99% KM (Chebyshev) UCL	1198
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (BCA) UCL	263
95% Gamma Approximate UCL (Use when n >= 40)	N/A		
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

CHRYSENE			
General Statistics			
Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	6
		Percent Non-Detects	75.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	39.8	Minimum Detected	3.684
Maximum Detected	238	Maximum Detected	5.472
Mean of Detected	138.9	Mean of Detected	4.578
SD of Detected	140.1	SD of Detected	1.265
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	410	Maximum Non-Detect	6.016
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	167.2	Mean	5.023
SD	57.15	SD	0.555
95% DL/2 (t) UCL	205.5	95% H-Stat (DL/2) UCL	296.5
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

CHRYSENE (Continued)				
Gamma Distribution Test with Detected Values Only			Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)		
Theta Star	N/A			
nu star	N/A			
A-D Test Statistic	N/A	Nonparametric Statistics		
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method		
K-S Test Statistic	N/A	Mean		138.9
5% K-S Critical Value	N/A	SD		99.1
Data not Gamma Distributed at 5% Significance Level		SE of Mean		99.1
		95% KM (t) UCL		326.7
Assuming Gamma Distribution		95% KM (z) UCL		301.9
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL		387.3
Minimum	N/A	95% KM (bootstrap t) UCL		N/A
Maximum	N/A	95% KM (BCA) UCL		238
Mean	N/A	95% KM (Percentile Bootstrap) UCL		238
Median	N/A	95% KM (Chebyshev) UCL		570.9
SD	N/A	97.5% KM (Chebyshev) UCL		757.8
k star	N/A	99% KM (Chebyshev) UCL		1125
Theta star	N/A			
Nu star	N/A	Potential UCLs to Use		
AppChi2	N/A	95% KM (BCA) UCL		238
95% Gamma Approximate UCL (Use when n >= 40)	N/A			
95% Adjusted Gamma UCL (Use when n < 40)	N/A			
Note: DL/2 is not a recommended method.				
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.				
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).				
For additional insight, the user may want to consult a statistician.				

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

DIBENZO(A,H)ANTHRACENE			
General Statistics			
Number of Valid Data	8	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	7
		Percent Non-Detects	87.50%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable DIBENZO(A,H)ANTHRACENE was not processed!			

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

INDENO(1,2,3-CD)PYRENE			
General Statistics			
Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	6
		Percent Non-Detects	75.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	24.6	Minimum Detected	3.203
Maximum Detected	99.1	Maximum Detected	4.596
Mean of Detected	61.85	Mean of Detected	3.899
SD of Detected	52.68	SD of Detected	0.985
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	410	Maximum Non-Detect	6.016
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	148	Mean	4.854
SD	58.1	SD	0.7
95% DL/2 (t) UCL	186.9	95% H-Stat (DL/2) UCL	337.7
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

INDENO(1,2,3-CD)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	61.85
5% K-S Critical Value	N/A	SD	37.25
Data not Gamma Distributed at 5% Significance Level		SE of Mean	37.25
		95% KM (t) UCL	132.4
Assuming Gamma Distribution		95% KM (z) UCL	123.1
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	155.2
Minimum	N/A	95% KM (bootstrap t) UCL	117.7
Maximum	N/A	95% KM (BCA) UCL	N/A
Mean	N/A	95% KM (Percentile Bootstrap) UCL	99.1
Median	N/A	95% KM (Chebyshev) UCL	224.2
SD	N/A	97.5% KM (Chebyshev) UCL	294.5
k star	N/A	99% KM (Chebyshev) UCL	432.5
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	132.4
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	99.1
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Warning: Recommended UCL exceeds the maximum observation			
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

ARSENIC			
General Statistics			
Number of Valid Data	8	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	1
		Percent Non-Detects	12.50%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.8	Minimum Detected	1.03
Maximum Detected	9.81	Maximum Detected	2.283
Mean of Detected	4.824	Mean of Detected	1.478
SD of Detected	2.498	SD of Detected	0.451
Minimum Non-Detect	2.9	Minimum Non-Detect	1.065
Maximum Non-Detect	2.9	Maximum Non-Detect	1.065
Warning: There are only 7 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.823	Shapiro Wilk Test Statistic	0.91
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.403	Mean	1.34
SD	2.602	SD	0.573
95% DL/2 (t) UCL	6.146	95% H-Stat (DL/2) UCL	7.698
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	4.139	Mean in Log Scale	1.392
SD	2.785	SD in Log Scale	0.484
95% MLE (t) UCL	6.005	Mean in Original Scale	4.496
95% MLE (Tiku) UCL	6.048	SD in Original Scale	2.493
		95% t UCL	6.165
		95% Percentile Bootstrap UCL	5.929
		95% BCA Bootstrap UCL	6.343
		95% H UCL	6.925
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	3.182	Data appear Normal at 5% Significance Level	
Theta Star	1.516		
nu star	44.55		
A-D Test Statistic	0.417	Nonparametric Statistics	
5% A-D Critical Value	0.71	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.71	Mean	4.571
5% K-S Critical Value	0.313	SD	2.265
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.865
		95% KM (t) UCL	6.21
		95% KM (z) UCL	5.994
		95% KM (jackknife) UCL	6.183
		95% KM (bootstrap t) UCL	8.348
		95% KM (BCA) UCL	6.075
		95% KM (Percentile Bootstrap) UCL	6.024
		95% KM (Chebyshev) UCL	8.341
		97.5% KM (Chebyshev) UCL	9.972
		99% KM (Chebyshev) UCL	13.18
Assuming Gamma Distribution		Potential UCLs to Use	
Gamma ROS Statistics using Extrapolated Data		95% KM (t) UCL	6.21
Minimum	1.258	95% KM (Percentile Bootstrap) UCL	6.024
Maximum	9.81		
Mean	4.378		
Median	3.55		
SD	2.634		
k star	2.204		
Theta star	1.987		
Nu star	35.26		
AppChi2	22.68		
95% Gamma Approximate UCL (Use when n >= 40)	6.809		
95% Adjusted Gamma UCL (Use when n < 40)	7.658		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

CHROMIUM			
General Statistics			
Number of Valid Data	8	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	2
		Percent Non-Detects	25.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	6.7	Minimum Detected	1.902
Maximum Detected	16.1	Maximum Detected	2.779
Mean of Detected	9.397	Mean of Detected	2.195
SD of Detected	3.439	SD of Detected	0.313
Minimum Non-Detect	6.5	Minimum Non-Detect	1.872
Maximum Non-Detect	6.9	Maximum Non-Detect	1.932
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	3
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	5
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	37.50%
Warning: There are only 6 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.769	Shapiro Wilk Test Statistic	0.856
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	7.885	Mean	1.948
SD	4.035	SD	0.528
95% DL/2 (t) UCL	10.59	95% H-Stat (DL/2) UCL	13.03
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	7.663	Mean in Log Scale	2.034
SD	4.121	SD in Log Scale	0.401
95% MLE (t) UCL	10.42	Mean in Original Scale	8.233
95% MLE (Tiku) UCL	10.7	SD in Original Scale	3.626
		95% t UCL	10.66
		95% Percentile Bootstrap UCL	10.35
		95% BCA Bootstrap UCL	11.02
		95% H UCL	11.57

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

CHROMIUM (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	5.725	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.641		
nu star	68.7		
A-D Test Statistic	0.563	Nonparametric Statistics	
5% A-D Critical Value	0.698	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.698	Mean	8.723
5% K-S Critical Value	0.332	SD	2.959
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	1.146
		95% KM (t) UCL	10.89
Assuming Gamma Distribution		95% KM (z) UCL	10.61
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	10.78
Minimum	0.539	95% KM (bootstrap t) UCL	13.42
Maximum	16.1	95% KM (BCA) UCL	11.11
Mean	7.515	95% KM (Percentile Bootstrap) UCL	10.76
Median	7.6	95% KM (Chebyshev) UCL	13.72
SD	4.592	97.5% KM (Chebyshev) UCL	15.88
k star	1.21	99% KM (Chebyshev) UCL	20.12
Theta star	6.21		
Nu star	19.36	Potential UCLs to Use	
AppChi2	10.38	95% KM (Percentile Bootstrap) UCL	10.76
95% Gamma Approximate UCL (Use when n >= 40)	14.02		
95% Adjusted Gamma UCL (Use when n < 40)	16.59		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

COBALT			
General Statistics			
Number of Valid Data	8	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	2
		Percent Non-Detects	25.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.6	Minimum Detected	0.956
Maximum Detected	9.56	Maximum Detected	2.258
Mean of Detected	5.93	Mean of Detected	1.693
SD of Detected	2.565	SD of Detected	0.472
Minimum Non-Detect	3.5	Minimum Non-Detect	1.253
Maximum Non-Detect	4.6	Maximum Non-Detect	1.526
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	4
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	4
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	50.00%
Warning: There are only 6 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.969	Shapiro Wilk Test Statistic	0.962
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.954	Mean	1.444
SD	2.827	SD	0.614
95% DL/2 (t) UCL	6.847	95% H-Stat (DL/2) UCL	9.274
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	4.629	Mean in Log Scale	1.532
SD	3.13	SD in Log Scale	0.5
95% MLE (t) UCL	6.726	Mean in Original Scale	5.163
95% MLE (Tiku) UCL	7.211	SD in Original Scale	2.595
		95% t UCL	6.901
		95% Percentile Bootstrap UCL	6.623
		95% BCA Bootstrap UCL	6.87
		95% H UCL	8.185

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

COBALT (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	3.074	Data appear Normal at 5% Significance Level	
Theta Star	1.929		
nu star	36.88		
A-D Test Statistic	0.211	Nonparametric Statistics	
5% A-D Critical Value	0.698	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.698	Mean	5.173
5% K-S Critical Value	0.333	SD	2.439
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.954
		95% KM (t) UCL	6.98
Assuming Gamma Distribution		95% KM (z) UCL	6.742
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	6.975
Minimum	1.858	95% KM (bootstrap t) UCL	7.224
Maximum	9.56	95% KM (BCA) UCL	7.143
Mean	5.049	95% KM (Percentile Bootstrap) UCL	6.898
Median	4.5	95% KM (Chebyshev) UCL	9.331
SD	2.729	97.5% KM (Chebyshev) UCL	11.13
k star	2.473	99% KM (Chebyshev) UCL	14.66
Theta star	2.041		
Nu star	39.57	Potential UCLs to Use	
AppChi2	26.16	95% KM (t) UCL	6.98
95% Gamma Approximate UCL (Use when n >= 40)	7.637	95% KM (Percentile Bootstrap) UCL	6.898
95% Adjusted Gamma UCL (Use when n < 40)	8.524		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Unpaved Surface Soil - North W
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
ALUMINUM	
General Statistics	
Number of Valid Observations	8
Number of Distinct Observations	8
Raw Statistics	
Minimum	3440
Maximum	9650
Mean	5263
Geometric Mean	5001
Median	4540
SD	2003
Std. Error of Mean	708.3
Coefficient of Variation	0.381
Skewness	1.86
Log-transformed Statistics	
Minimum of Log Data	8.143
Maximum of Log Data	9.175
Mean of log Data	8.517
SD of log Data	0.324
Warning: There are only 8 Values in this data	
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions	
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.	
Relevant UCL Statistics	
Normal Distribution Test	
Shapiro Wilk Test Statistic	0.762
Shapiro Wilk Critical Value	0.818
Data not Normal at 5% Significance Level	
Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.847
Shapiro Wilk Critical Value	0.818
Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution	
95% Student's-t UCL	6604
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	6925
95% Modified-t UCL (Johnson-1978)	6682
Assuming Lognormal Distribution	
95% H-UCL	6806
95% Chebyshev (MVUE) UCL	7860
97.5% Chebyshev (MVUE) UCL	8996
99% Chebyshev (MVUE) UCL	11228
Gamma Distribution Test	
k star (bias corrected)	6.315
Theta Star	833.4
MLE of Mean	5263
MLE of Standard Deviation	2094
nu star	101
Approximate Chi Square Value (.05)	78.84
Adjusted Level of Significance	0.0195
Adjusted Chi Square Value	73.9
Data not Gamma Distributed at 5% Significance Level	
Data Distribution	
Data appear Lognormal at 5% Significance Level	
Nonparametric Statistics	
95% CLT UCL	6428
95% Jackknife UCL	6604
95% Standard Bootstrap UCL	6353
95% Bootstrap-t UCL	10057
95% Hall's Bootstrap UCL	15431
95% Percentile Bootstrap UCL	6433
95% BCA Bootstrap UCL	6760
95% Chebyshev(Mean, Sd) UCL	8350
97.5% Chebyshev(Mean, Sd) UCL	9686
99% Chebyshev(Mean, Sd) UCL	12310
Assuming Gamma Distribution	
95% Approximate Gamma UCL (Use when n >= 40)	6744
95% Adjusted Gamma UCL (Use when n < 40)	7195
Potential UCL to Use	
Use 95% Student's-t UCL	6604
or 95% Modified-t UCL	6682
or 95% H-UCL	6806
ProUCL computes and outputs H-statistic based UCLs for historical reasons only.	
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.	
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.	
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.	
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.	

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

IRON						
General Statistics						
Number of Valid Observations			8	Number of Distinct Observations		
				8		
Raw Statistics			Log-transformed Statistics			
Minimum		11500	Minimum of Log Data		9.35	
Maximum		27100	Maximum of Log Data		10.21	
Mean		15125	Mean of log Data		9.579	
Geometric Mean		14452	SD of log Data		0.304	
Median		12850				
SD		5485				
Std. Error of Mean		1939				
Coefficient of Variation		0.363				
Skewness		1.923				
Warning: There are only 8 Values in this data						
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions						
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.						
Relevant UCL Statistics						
Normal Distribution Test			Lognormal Distribution Test			
Shapiro Wilk Test Statistic		0.69	Shapiro Wilk Test Statistic		0.738	
Shapiro Wilk Critical Value		0.818	Shapiro Wilk Critical Value		0.818	
Data not Normal at 5% Significance Level			Data not Lognormal at 5% Significance Level			
Assuming Normal Distribution			Assuming Lognormal Distribution			
95% Student's-t UCL		18799	95% H-UCL		19184	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		22123	
95% Adjusted-CLT UCL (Chen-1995)		19724	97.5% Chebyshev (MVUE) UCL		25186	
95% Modified-t UCL (Johnson-1978)		19019	99% Chebyshev (MVUE) UCL		31202	
Gamma Distribution Test			Data Distribution			
k star (bias corrected)		7.047	Data do not follow a Discernable Distribution (0.05)			
Theta Star		2146				
MLE of Mean		15125				
MLE of Standard Deviation		5697				
nu star		112.8				
Approximate Chi Square Value (.05)		89.24	Nonparametric Statistics			
Adjusted Level of Significance		0.0195	95% CLT UCL		18315	
Adjusted Chi Square Value		83.96	95% Jackknife UCL		18799	
			95% Standard Bootstrap UCL		18089	
Anderson-Darling Test Statistic		1.134	95% Bootstrap-t UCL		40220	
Anderson-Darling 5% Critical Value		0.715	95% Hall's Bootstrap UCL		42525	
Kolmogorov-Smirnov Test Statistic		0.393	95% Percentile Bootstrap UCL		18138	
Kolmogorov-Smirnov 5% Critical Value		0.294	95% BCA Bootstrap UCL		19425	
Data not Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		23578	
			97.5% Chebyshev(Mean, Sd) UCL		27235	
			99% Chebyshev(Mean, Sd) UCL		34419	
Assuming Gamma Distribution						
95% Approximate Gamma UCL (Use when n >= 40)		19110				
95% Adjusted Gamma UCL (Use when n < 40)		20312				
Potential UCL to Use			Use 95% Student's-t UCL		18799	
			or 95% Modified-t UCL		19019	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.						

PROUCL OUTPUT - NORTH WATERFRONT UNPAVED SURFACE SOIL

MANGANESE					
General Statistics					
Number of Valid Observations			8	Number of Distinct Observations	
				7	
Raw Statistics			Log-transformed Statistics		
Minimum			81.4	Minimum of Log Data	
				4.399	
Maximum			337	Maximum of Log Data	
				5.82	
Mean			170.9	Mean of log Data	
				5.044	
Geometric Mean			155.1	SD of log Data	
				0.458	
Median			143		
SD			86.2		
Std. Error of Mean			30.48		
Coefficient of Variation			0.504		
Skewness			1.325		
Warning: There are only 8 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic			0.828	Shapiro Wilk Test Statistic	
				0.918	
Shapiro Wilk Critical Value			0.818	Shapiro Wilk Critical Value	
				0.818	
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL			228.7	95% H-UCL	
				255.7	
95% UCLs (Adjusted for Skewness)				95% Chebyshev (MVUE) UCL	
				290.7	
95% Adjusted-CLT UCL (Chen-1995)			236.3	97.5% Chebyshev (MVUE) UCL	
				343	
95% Modified-t UCL (Johnson-1978)			231	99% Chebyshev (MVUE) UCL	
				445.7	
Gamma Distribution Test			Data Distribution		
k star (bias corrected)			3.403	Data appear Normal at 5% Significance Level	
Theta Star			50.23		
MLE of Mean			170.9		
MLE of Standard Deviation			92.66		
nu star			54.45		
Approximate Chi Square Value (.05)			38.49	Nonparametric Statistics	
Adjusted Level of Significance			0.0195	95% CLT UCL	
Adjusted Chi Square Value			35.13	221.1	
				95% Jackknife UCL	
				228.7	
				95% Standard Bootstrap UCL	
				216.8	
Anderson-Darling Test Statistic			0.55	95% Bootstrap-t UCL	
				335.6	
Anderson-Darling 5% Critical Value			0.719	95% Hall's Bootstrap UCL	
				656.1	
Kolmogorov-Smirnov Test Statistic			0.315	95% Percentile Bootstrap UCL	
				221.2	
Kolmogorov-Smirnov 5% Critical Value			0.295	95% BCA Bootstrap UCL	
				228.1	
Data follow Appr. Gamma Distribution at 5% Significance Level				95% Chebyshev(Mean, Sd) UCL	
				303.8	
				97.5% Chebyshev(Mean, Sd) UCL	
				361.2	
				99% Chebyshev(Mean, Sd) UCL	
				474.2	
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)			241.8		
95% Adjusted Gamma UCL (Use when n < 40)			264.9		
Potential UCL to Use			Use 95% Student's-t UCL		
				228.7	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

North Waterfront

Surface Soil

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

General UCL Statistics for Data Sets with Non-Detects		
User Selected Options		
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Surface Soil - North Waterfront.x	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	
BENZO(A)ANTHRACENE		
General Statistics		
Number of Valid Data	19	
Number of Distinct Detected Data	4	
	Number of Detected Data	4
	Number of Non-Detect Data	15
	Percent Non-Detects	78.95%
Raw Statistics		
Minimum Detected	15.7	
Maximum Detected	605	
Mean of Detected	221.1	
SD of Detected	274.2	
Minimum Non-Detect	3.56	
Maximum Non-Detect	12000	
Log-transformed Statistics		
Minimum Detected	2.754	
Maximum Detected	6.405	
Mean of Detected	4.516	
SD of Detected	1.699	
Minimum Non-Detect	1.27	
Maximum Non-Detect	9.393	
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		
Observations < Largest ND are treated as NDs		
Number treated as Non-Detect		19
Number treated as Detected		0
Single DL Non-Detect Percentage		100.00%
Warning: There are only 4 Distinct Detected Values in this data		
Note: It should be noted that even though bootstrap may be performed on this data set		
the resulting calculations may not be reliable enough to draw conclusions		
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.		
UCL Statistics		
Normal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.853	
5% Shapiro Wilk Critical Value	0.748	
Data appear Normal at 5% Significance Level		
Assuming Normal Distribution		
DL/2 Substitution Method		
Mean	486.4	
SD	1341	
95% DL/2 (t) UCL	1020	
Maximum Likelihood Estimate(MLE) Method	N/A	
MLE method failed to converge properly		
Lognormal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.933	
5% Shapiro Wilk Critical Value	0.748	
Data appear Lognormal at 5% Significance Level		
Assuming Lognormal Distribution		
DL/2 Substitution Method		
Mean	4.995	
SD	1.553	
95% H-Stat (DL/2) UCL	1760	
Log ROS Method		
Mean in Log Scale	3.397	
SD in Log Scale	1.229	
Mean in Original Scale	71.59	
SD in Original Scale	139.2	
95% t UCL	127	
95% Percentile Bootstrap UCL	131.4	
95% BCA Bootstrap UCL	163.5	
95% H-UCL	149.5	

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

BENZO(A)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.338	Data appear Normal at 5% Significance Level	
Theta Star	653.6		
nu star	2.707		
A-D Test Statistic	0.313	Nonparametric Statistics	
5% A-D Critical Value	0.673	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.673	Mean	103.3
5% K-S Critical Value	0.406	SD	150.7
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	59.92
		95% KM (t) UCL	207.2
Assuming Gamma Distribution		95% KM (z) UCL	201.9
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	211.1
Minimum	0.000001	95% KM (bootstrap t) UCL	209.7
Maximum	605	95% KM (BCA) UCL	278.6
Mean	82.99	95% KM (Percentile Bootstrap) UCL	290.9
Median	12.07	95% KM (Chebyshev) UCL	364.5
SD	149.8	97.5% KM (Chebyshev) UCL	477.5
k star	0.115	99% KM (Chebyshev) UCL	699.5
Theta star	722		
Nu star	4.368	Potential UCLs to Use	
AppChi2	0.872	95% KM (t) UCL	207.2
95% Gamma Approximate UCL (Use when n >= 40)	415.6	95% KM (Percentile Bootstrap) UCL	290.9
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

BENZO(A)PYRENE			
General Statistics			
Number of Valid Data	19	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	15
		Percent Non-Detects	78.95%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	11.7	Minimum Detected	2.46
Maximum Detected	530	Maximum Detected	6.273
Mean of Detected	184.1	Mean of Detected	4.307
SD of Detected	240.6	SD of Detected	1.709
Minimum Non-Detect	3.56	Minimum Non-Detect	1.27
Maximum Non-Detect	12000	Maximum Non-Detect	9.393
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	19
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There are only 4 Distinct Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.827	Shapiro Wilk Test Statistic	0.966
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	478.6	Mean	4.951
SD	1341	SD	1.571
95% DL/2 (t) UCL	1012	95% H-Stat (DL/2) UCL	1780
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	3.162
		SD in Log Scale	1.251
		Mean in Original Scale	58.7
		SD in Original Scale	120.1
		95% t UCL	106.5
		95% Percentile Bootstrap UCL	108.5
		95% BCA Bootstrap UCL	146.3
		95% H-UCL	124.4

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

BENZO(A)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.334	Data appear Normal at 5% Significance Level	
Theta Star	551.2		
nu star	2.672		
A-D Test Statistic	0.273	Nonparametric Statistics	
5% A-D Critical Value	0.674	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.674	Mean	80.92
5% K-S Critical Value	0.407	SD	125.5
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	45.88
		95% KM (t) UCL	160.5
Assuming Gamma Distribution		95% KM (z) UCL	156.4
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	161
Minimum	0.000001	95% KM (bootstrap t) UCL	166
Maximum	530	95% KM (BCA) UCL	225.8
Mean	67.57	95% KM (Percentile Bootstrap) UCL	225.8
Median	1.923	95% KM (Chebyshev) UCL	280.9
SD	128.6	97.5% KM (Chebyshev) UCL	367.4
k star	0.115	99% KM (Chebyshev) UCL	537.4
Theta star	587.9		
Nu star	4.368	Potential UCLs to Use	
AppChi2	0.872	95% KM (t) UCL	160.5
95% Gamma Approximate UCL (Use when n >= 40)	338.4	95% KM (Percentile Bootstrap) UCL	225.8
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

BENZO(B)FLUORANTHENE			
General Statistics			
Number of Valid Data	19	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	15
		Percent Non-Detects	78.95%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	15.5	Minimum Detected	2.741
Maximum Detected	805	Maximum Detected	6.691
Mean of Detected	284.4	Mean of Detected	4.748
SD of Detected	363.7	SD of Detected	1.738
Minimum Non-Detect	3.56	Minimum Non-Detect	1.27
Maximum Non-Detect	12000	Maximum Non-Detect	9.393
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	19
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There are only 4 Distinct Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.841	Shapiro Wilk Test Statistic	0.98
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	499.7	Mean	5.044
SD	1342	SD	1.547
95% DL/2 (t) UCL	1033	95% H-Stat (DL/2) UCL	1817
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	3.592
		SD in Log Scale	1.266
		Mean in Original Scale	90.67
		SD in Original Scale	183
		95% t UCL	163.5
		95% Percentile Bootstrap UCL	167.7
		95% BCA Bootstrap UCL	215.4
		95% H-UCL	198.4

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

BENZO(B)FLUORANTHENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.335	Data appear Normal at 5% Significance Level	
Theta Star	848.7		
nu star	2.68		
A-D Test Statistic	0.238	Nonparametric Statistics	
5% A-D Critical Value	0.674	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.674	Mean	126.9
5% K-S Critical Value	0.407	SD	192.4
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	71.74
		95% KM (t) UCL	251.3
Assuming Gamma Distribution		95% KM (z) UCL	244.9
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	252.4
Minimum	0.000001	95% KM (bootstrap t) UCL	252.9
Maximum	805	95% KM (BCA) UCL	N/A
Mean	105.3	95% KM (Percentile Bootstrap) UCL	323.2
Median	8.061	95% KM (Chebyshev) UCL	439.6
SD	196.1	97.5% KM (Chebyshev) UCL	574.9
k star	0.114	99% KM (Chebyshev) UCL	840.7
Theta star	926.1		
Nu star	4.32	Potential UCLs to Use	
AppChi2	0.852	95% KM (t) UCL	251.3
95% Gamma Approximate UCL (Use when n >= 40)	533.8	95% KM (Percentile Bootstrap) UCL	323.2
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

CHRYSENE			
General Statistics			
Number of Valid Data	19	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	15
		Percent Non-Detects	78.95%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	16.5	Minimum Detected	2.803
Maximum Detected	580	Maximum Detected	6.363
Mean of Detected	218.6	Mean of Detected	4.581
SD of Detected	260.6	SD of Detected	1.626
Minimum Non-Detect	3.56	Minimum Non-Detect	1.27
Maximum Non-Detect	12000	Maximum Non-Detect	9.393
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	19
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There are only 4 Distinct Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.868	Shapiro Wilk Test Statistic	0.95
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	485.8	Mean	5.009
SD	1340	SD	1.536
95% DL/2 (t) UCL	1019	95% H-Stat (DL/2) UCL	1695
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	3.51
		SD in Log Scale	1.176
		Mean in Original Scale	73.62
		SD in Original Scale	133.6
		95% t UCL	126.8
		95% Percentile Bootstrap UCL	130
		95% BCA Bootstrap UCL	173.1
		95% H-UCL	147.9

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

CHRYSENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.352	Data appear Normal at 5% Significance Level	
Theta Star	620.1		
nu star	2.82		
A-D Test Statistic	0.284	Nonparametric Statistics	
5% A-D Critical Value	0.671	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.671	Mean	105.6
5% K-S Critical Value	0.405	SD	146.3
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	59.62
		95% KM (t) UCL	209
Assuming Gamma Distribution		95% KM (z) UCL	203.7
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	213
Minimum	0.000001	95% KM (bootstrap t) UCL	202.2
Maximum	580	95% KM (BCA) UCL	295
Mean	84.52	95% KM (Percentile Bootstrap) UCL	276
Median	16.5	95% KM (Chebyshev) UCL	365.5
SD	144.8	97.5% KM (Chebyshev) UCL	477.9
k star	0.142	99% KM (Chebyshev) UCL	698.8
Theta star	594.3		
Nu star	5.404	Potential UCLs to Use	
AppChi2	1.343	95% KM (t) UCL	209
95% Gamma Approximate UCL (Use when n >= 40)	340	95% KM (Percentile Bootstrap) UCL	276
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

DIBENZO(A,H)ANTHRACENE			
General Statistics			
Number of Valid Data	19	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	18
		Percent Non-Detects	94.74%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable DIBENZO(A,H)ANTHRACENE was not processed!			

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

INDENO(1,2,3-CD)PYRENE			
General Statistics			
Number of Valid Data	19	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	15
		Percent Non-Detects	78.95%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	12	Minimum Detected	2.485
Maximum Detected	380	Maximum Detected	5.94
Mean of Detected	128.9	Mean of Detected	4.056
SD of Detected	171.7	SD of Detected	1.532
Minimum Non-Detect	3.56	Minimum Non-Detect	1.27
Maximum Non-Detect	12000	Maximum Non-Detect	9.393
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	19
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There are only 4 Distinct Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.796	Shapiro Wilk Test Statistic	0.966
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	467	Mean	4.898
SD	1342	SD	1.567
95% DL/2 (t) UCL	1001	95% H-Stat (DL/2) UCL	1668
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	3.014
		SD in Log Scale	1.14
		Mean in Original Scale	43.89
		SD in Original Scale	84.66
		95% t UCL	77.57
		95% Percentile Bootstrap UCL	79.21
		95% BCA Bootstrap UCL	104.5
		95% H-UCL	83.12

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

INDENO(1,2,3-CD)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.353	Data appear Normal at 5% Significance Level	
Theta Star	365.1		
nu star	2.825		
A-D Test Statistic	0.301	Nonparametric Statistics	
5% A-D Critical Value	0.67	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.67	Mean	57.11
5% K-S Critical Value	0.405	SD	88.06
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	29.99
		95% KM (t) UCL	109.1
Assuming Gamma Distribution		95% KM (z) UCL	106.4
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	107.6
Minimum	0.000001	95% KM (bootstrap t) UCL	115.9
Maximum	380	95% KM (BCA) UCL	380
Mean	47.76	95% KM (Percentile Bootstrap) UCL	143.5
Median	0.718	95% KM (Chebyshev) UCL	187.8
SD	91.34	97.5% KM (Chebyshev) UCL	244.4
k star	0.123	99% KM (Chebyshev) UCL	355.5
Theta star	388.9		
Nu star	4.666	Potential UCLs to Use	
AppChi2	1.001	95% KM (t) UCL	109.1
95% Gamma Approximate UCL (Use when n >= 40)	222.6	95% KM (Percentile Bootstrap) UCL	143.5
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

ARSENIC			
General Statistics			
Number of Valid Data	19	Number of Detected Data	17
Number of Distinct Detected Data	17	Number of Non-Detect Data	2
		Percent Non-Detects	10.53%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.41	Minimum Detected	0.88
Maximum Detected	10.85	Maximum Detected	2.384
Mean of Detected	5.064	Mean of Detected	1.521
SD of Detected	2.521	SD of Detected	0.451
Minimum Non-Detect	2.9	Minimum Non-Detect	1.065
Maximum Non-Detect	3.3	Maximum Non-Detect	1.194
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	6
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	13
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	31.58%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.847	Shapiro Wilk Test Statistic	0.943
5% Shapiro Wilk Critical Value	0.892	5% Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.694	Mean	1.407
SD	2.623	SD	0.546
95% DL/2 (t) UCL	5.738	95% H-Stat (DL/2) UCL	6.173
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	4.351	Mean in Log Scale	1.457
SD	3.025	SD in Log Scale	0.466
95% MLE (t) UCL	5.554	Mean in Original Scale	4.793
95% MLE (Tiku) UCL	5.63	SD in Original Scale	2.512
		95% t UCL	5.793
		95% Percentile Bootstrap UCL	5.781
		95% BCA Bootstrap UCL	5.912
		95% H UCL	5.949
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	4.243	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.193		
nu star	144.3		
A-D Test Statistic	0.534	Nonparametric Statistics	
5% A-D Critical Value	0.741	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.741	Mean	4.809
5% K-S Critical Value	0.21	SD	2.431
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.575
		95% KM (t) UCL	5.806
		95% KM (z) UCL	5.755
		95% KM (jackknife) UCL	5.804
		95% KM (bootstrap t) UCL	6.172
		95% KM (BCA) UCL	5.762
		95% KM (Percentile Bootstrap) UCL	5.731
		95% KM (Chebyshev) UCL	7.316
		97.5% KM (Chebyshev) UCL	8.401
		99% KM (Chebyshev) UCL	10.53
Assuming Gamma Distribution		Potential UCLs to Use	
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL	5.762
Minimum	1.707		
Maximum	10.85		
Mean	4.735		
Median	4.5		
SD	2.575		
k star	3.53		
Theta star	1.341		
Nu star	134.1		
AppChi2	108.4		
95% Gamma Approximate UCL (Use when n >= 40)	5.86		
95% Adjusted Gamma UCL (Use when n < 40)	5.971		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

CHROMIUM			
General Statistics			
Number of Valid Data	19	Number of Detected Data	17
Number of Distinct Detected Data	17	Number of Non-Detect Data	2
		Percent Non-Detects	10.53%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	5.2	Minimum Detected	1.649
Maximum Detected	24.1	Maximum Detected	3.182
Mean of Detected	9.372	Mean of Detected	2.155
SD of Detected	4.643	SD of Detected	0.391
Minimum Non-Detect	6.5	Minimum Non-Detect	1.872
Maximum Non-Detect	6.9	Maximum Non-Detect	1.932
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	7
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	12
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	36.84%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.74	Shapiro Wilk Test Statistic	0.905
5% Shapiro Wilk Critical Value	0.892	5% Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	8.738	Mean	2.055
SD	4.771	SD	0.474
95% DL/2 (t) UCL	10.64	95% H-Stat (DL/2) UCL	10.91
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	7.77	Mean in Log Scale	2.104
SD	5.783	SD in Log Scale	0.399
95% MLE (t) UCL	10.07	Mean in Original Scale	8.946
95% MLE (Tiku) UCL	10.29	SD in Original Scale	4.56
		95% t UCL	10.76
		95% Percentile Bootstrap UCL	10.73
		95% BCA Bootstrap UCL	11.2
		95% H UCL	10.64
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	5.156	Data appear Lognormal at 5% Significance Level	
Theta Star	1.818		
nu star	175.3		
A-D Test Statistic	0.851	Nonparametric Statistics	
5% A-D Critical Value	0.741	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.741	Mean	8.98
5% K-S Critical Value	0.21	SD	4.414
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.045
Assuming Gamma Distribution		95% KM (t) UCL	10.79
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	10.7
Minimum	4.028	95% KM (jackknife) UCL	10.79
Maximum	24.1	95% KM (bootstrap t) UCL	12.6
Mean	8.88	95% KM (BCA) UCL	10.84
Median	7.8	95% KM (Percentile Bootstrap) UCL	10.77
SD	4.623	95% KM (Chebyshev) UCL	13.53
k star	4.663	97.5% KM (Chebyshev) UCL	15.5
Theta star	1.904	99% KM (Chebyshev) UCL	19.38
Nu star	177.2	Potential UCLs to Use	
AppChi2	147.4	95% KM (Chebyshev) UCL	13.53
95% Gamma Approximate UCL (Use when n >= 40)	10.67		
95% Adjusted Gamma UCL (Use when n < 40)	10.85		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

COBALT			
General Statistics			
Number of Valid Data	19	Number of Detected Data	17
Number of Distinct Detected Data	16	Number of Non-Detect Data	2
		Percent Non-Detects	10.53%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.6	Minimum Detected	0.956
Maximum Detected	14.7	Maximum Detected	2.688
Mean of Detected	7.025	Mean of Detected	1.858
SD of Detected	3.022	SD of Detected	0.453
Minimum Non-Detect	3.5	Minimum Non-Detect	1.253
Maximum Non-Detect	4.6	Maximum Non-Detect	1.526
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	7
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	12
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	36.84%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Test Statistic	0.954
5% Shapiro Wilk Critical Value	0.892	5% Shapiro Wilk Critical Value	0.892
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	6.498	Mean	1.736
SD	3.258	SD	0.564
95% DL/2 (t) UCL	7.794	95% H-Stat (DL/2) UCL	8.763
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	6.054	Mean in Log Scale	1.791
SD	3.806	SD in Log Scale	0.473
95% MLE (t) UCL	7.568	Mean in Original Scale	6.644
95% MLE (Tiku) UCL	7.733	SD in Original Scale	3.071
		95% t UCL	7.866
		95% Percentile Bootstrap UCL	7.793
		95% BCA Bootstrap UCL	7.917
		95% H UCL	8.366
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	4.679	Data appear Normal at 5% Significance Level	
Theta Star	1.501		
nu star	159.1		
A-D Test Statistic	0.406	Nonparametric Statistics	
5% A-D Critical Value	0.741	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.741	Mean	6.633
5% K-S Critical Value	0.21	SD	3.006
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.713
Assuming Gamma Distribution		95% KM (t) UCL	7.869
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	7.805
Minimum	1.745	95% KM (jackknife) UCL	7.869
Maximum	14.7	95% KM (bootstrap t) UCL	8.067
Mean	6.567	95% KM (BCA) UCL	7.772
Median	6.42	95% KM (Percentile Bootstrap) UCL	7.814
SD	3.178	95% KM (Chebyshev) UCL	9.74
k star	3.599	97.5% KM (Chebyshev) UCL	11.08
Theta star	1.825	99% KM (Chebyshev) UCL	13.72
Nu star	136.7	Potential UCLs to Use	
AppChi2	110.7	95% KM (t) UCL	7.869
95% Gamma Approximate UCL (Use when n >= 40)	8.11	95% KM (Percentile Bootstrap) UCL	7.814
95% Adjusted Gamma UCL (Use when n < 40)	8.262		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Surface Soil - North Waterfront.x
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
ALUMINUM	
General Statistics	
Number of Valid Observations	19
Number of Distinct Observations	18
Raw Statistics	Log-transformed Statistics
Minimum	3440
Maximum	9650
Mean	5687
Geometric Mean	5426
Median	4920
SD	1896
Std. Error of Mean	435
Coefficient of Variation	0.333
Skewness	1.086
Relevant UCL Statistics	
Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.867
Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution	Assuming Lognormal Distribution
95% Student's-t UCL	6441
95% UCLs (Adjusted for Skewness)	95% H-UCL
95% Adjusted-CLT UCL (Chen-1995)	6501
95% Modified-t UCL (Johnson-1978)	7437
	95% Chebyshev (MVUE) UCL
	8201
	97.5% Chebyshev (MVUE) UCL
	9701
	99% Chebyshev (MVUE) UCL
Gamma Distribution Test	Data Distribution
k star (bias corrected)	9.138
Theta Star	622.3
MLE of Mean	5687
MLE of Standard Deviation	1881
nu star	347.2
Approximate Chi Square Value (.05)	305
Adjusted Level of Significance	0.0369
Adjusted Chi Square Value	301.6
Anderson-Darling Test Statistic	0.657
Anderson-Darling 5% Critical Value	0.741
Kolmogorov-Smirnov Test Statistic	0.168
Kolmogorov-Smirnov 5% Critical Value	0.199
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	Nonparametric Statistics
95% Approximate Gamma UCL (Use when n >= 40)	6473
95% Adjusted Gamma UCL (Use when n < 40)	6547
Potential UCL to Use	Use 95% Approximate Gamma UCL
	6473
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.	
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)	
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.	

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

IRON					
General Statistics					
Number of Valid Observations		19	Number of Distinct Observations		17
Raw Statistics			Log-transformed Statistics		
Minimum		11200	Minimum of Log Data		9.324
Maximum		27100	Maximum of Log Data		10.21
Mean		15774	Mean of log Data		9.638
Geometric Mean		15338	SD of log Data		0.238
Median		15400			
SD		4043			
Std. Error of Mean		927.5			
Coefficient of Variation		0.256			
Skewness		1.233			
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.88	Shapiro Wilk Test Statistic		0.93
Shapiro Wilk Critical Value		0.901	Shapiro Wilk Critical Value		0.901
Data not Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		17382	95% H-UCL		17458
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		19534
95% Adjusted-CLT UCL (Chen-1995)		17579	97.5% Chebyshev (MVUE) UCL		21170
95% Modified-t UCL (Johnson-1978)		17426	99% Chebyshev (MVUE) UCL		24383
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		15.2	Data appear Gamma Distributed at 5% Significance Level		
Theta Star		1038			
MLE of Mean		15774			
MLE of Standard Deviation		4046			
nu star		577.6			
Approximate Chi Square Value (.05)		522.8	Nonparametric Statistics		
Adjusted Level of Significance		0.0369	95% CLT UCL		17299
Adjusted Chi Square Value		518.3	95% Jackknife UCL		17382
			95% Standard Bootstrap UCL		17271
			95% Bootstrap-t UCL		17768
Anderson-Darling Test Statistic		0.545	95% Hall's Bootstrap UCL		18133
Anderson-Darling 5% Critical Value		0.74	95% Percentile Bootstrap UCL		17374
Kolmogorov-Smirnov Test Statistic		0.165	95% BCA Bootstrap UCL		17489
Kolmogorov-Smirnov 5% Critical Value		0.198	95% Chebyshev(Mean, Sd) UCL		19816
Data appear Gamma Distributed at 5% Significance Level			97.5% Chebyshev(Mean, Sd) UCL		21566
			99% Chebyshev(Mean, Sd) UCL		25002
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		17425			
95% Adjusted Gamma UCL (Use when n < 40)		17578			
Potential UCL to Use			Use 95% Approximate Gamma UCL		17425
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)					
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

PROUCL OUTPUT - NORTH WATERFRONT SURFACE SOIL

MANGANESE					
General Statistics					
Number of Valid Observations		19		Number of Distinct Observations	
				18	
Raw Statistics			Log-transformed Statistics		
Minimum		81.4	Minimum of Log Data		4.399
Maximum		340	Maximum of Log Data		5.829
Mean		210.7	Mean of log Data		5.251
Geometric Mean		190.7	SD of log Data		0.474
Median		187			
SD		91.52			
Std. Error of Mean		21			
Coefficient of Variation		0.434			
Skewness		0.163			
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.896	Shapiro Wilk Test Statistic		0.91
Shapiro Wilk Critical Value		0.901	Shapiro Wilk Critical Value		0.901
Data not Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		247.1	95% H-UCL		266.2
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		315.6
95% Adjusted-CLT UCL (Chen-1995)		246.1	97.5% Chebyshev (MVUE) UCL		360.4
95% Modified-t UCL (Johnson-1978)		247.3	99% Chebyshev (MVUE) UCL		448.5
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		4.389	Data appear Gamma Distributed at 5% Significance Level		
Theta Star		48.01			
MLE of Mean		210.7			
MLE of Standard Deviation		100.6			
nu star		166.8			
Approximate Chi Square Value (.05)		137.9	Nonparametric Statistics		
Adjusted Level of Significance		0.0369	95% CLT UCL		245.2
Adjusted Chi Square Value		135.6	95% Jackknife UCL		247.1
			95% Standard Bootstrap UCL		244.8
Anderson-Darling Test Statistic		0.664	95% Bootstrap-t UCL		247.8
Anderson-Darling 5% Critical Value		0.742	95% Hall's Bootstrap UCL		243.7
Kolmogorov-Smirnov Test Statistic		0.17	95% Percentile Bootstrap UCL		244.7
Kolmogorov-Smirnov 5% Critical Value		0.199	95% BCA Bootstrap UCL		246.4
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		302.2
			97.5% Chebyshev(Mean, Sd) UCL		341.8
Assuming Gamma Distribution			99% Chebyshev(Mean, Sd) UCL		419.6
95% Approximate Gamma UCL (Use when n >= 40)		254.8			
95% Adjusted Gamma UCL (Use when n < 40)		259.1			
Potential UCL to Use			Use 95% Approximate Gamma UCL		254.8
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)					
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

North Waterfront

Subsurface Soil

PROUCL OUTPUT - NORTH WATERFRONT SUBSURFACE SOIL

General UCL Statistics for Data Sets with Non-Detects	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - North Waterfr
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
BENZO(A)PYRENE	
General Statistics	
Number of Valid Data	21
Number of Distinct Detected Data	2
Number of Missing Values	12
Number of Detected Data	2
Number of Non-Detect Data	19
Percent Non-Detects	90.48%
Raw Statistics	Log-transformed Statistics
Minimum Detected	23.3
Maximum Detected	44
Mean of Detected	33.65
SD of Detected	14.64
Minimum Non-Detect	3.42
Maximum Non-Detect	11000
Minimum Detected	3.148
Maximum Detected	3.784
Mean of Detected	3.466
SD of Detected	0.45
Minimum Non-Detect	1.23
Maximum Non-Detect	9.306
Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage
Warning: Data set has only 2 Distinct Detected Values.	
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.	
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).	
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.	
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.	
Those methods will return a 'N/A' value on your output display!	
It is necessary to have 4 or more Distinct Values for bootstrap methods.	
However, results obtained using 4 to 9 distinct values may not be reliable.	
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.	
UCL Statistics	
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level
Assuming Normal Distribution	Assuming Lognormal Distribution
DL/2 Substitution Method	DL/2 Substitution Method
Mean	399.6
SD	1171
95% DL/2 (t) UCL	840.4
Mean	4.56
SD	1.92
95% H-Stat (DL/2) UCL	3370
Maximum Likelihood Estimate(MLE) Method	N/A
MLE method failed to converge properly	Log ROS Method
	Mean in Log Scale
	SD in Log Scale
	Mean in Original Scale
	SD in Original Scale
	95% t UCL
	95% Percentile Bootstrap UCL
	95% BCA Bootstrap UCL
	95% H-UCL

PROUCL OUTPUT - NORTH WATERFRONT SUBSURFACE SOIL

BENZO(A)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	27.44
5% K-S Critical Value	N/A	SD	8.28
Data not Gamma Distributed at 5% Significance Level		SE of Mean	5.237
		95% KM (t) UCL	36.47
Assuming Gamma Distribution		95% KM (z) UCL	36.05
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	40.97
Minimum	N/A	95% KM (bootstrap t) UCL	32.22
Maximum	N/A	95% KM (BCA) UCL	44
Mean	N/A	95% KM (Percentile Bootstrap) UCL	44
Median	N/A	95% KM (Chebyshev) UCL	50.27
SD	N/A	97.5% KM (Chebyshev) UCL	60.14
k star	N/A	99% KM (Chebyshev) UCL	79.54
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	36.47
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	44
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT SUBSURFACE SOIL

DIBENZO(A,H)ANTHRACENE			
General Statistics			
Number of Valid Data	21	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	20
Number of Missing Values	12	Percent Non-Detects	95.24%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable DIBENZO(A,H)ANTHRACENE was not processed!			
COBALT			
General Statistics			
Number of Valid Data	39	Number of Detected Data	33
Number of Distinct Detected Data	32	Number of Non-Detect Data	6
		Percent Non-Detects	15.38%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	3	Minimum Detected	1.099
Maximum Detected	19.8	Maximum Detected	2.986
Mean of Detected	8.161	Mean of Detected	2.002
SD of Detected	3.816	SD of Detected	0.446
Minimum Non-Detect	2.6	Minimum Non-Detect	0.956
Maximum Non-Detect	3.2	Maximum Non-Detect	1.163
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	7
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	32
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	17.95%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.911	Shapiro Wilk Test Statistic	0.986
5% Shapiro Wilk Critical Value	0.931	5% Shapiro Wilk Critical Value	0.931
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	7.131	Mean	1.752
SD	4.273	SD	0.721
95% DL/2 (t) UCL	8.285	95% H-Stat (DL/2) UCL	9.571
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	6.943	Mean in Log Scale	1.848
SD	4.558	SD in Log Scale	0.55
95% MLE (t) UCL	8.173	Mean in Original Scale	7.327
95% MLE (Tiku) UCL	8.192	SD in Original Scale	4.025
		95% t UCL	8.414
		95% Percentile Bootstrap UCL	8.426
		95% BCA Bootstrap UCL	8.449
		95% H UCL	8.79

PROUCL OUTPUT - NORTH WATERFRONT SUBSURFACE SOIL

DIBENZO(A,H)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	4.824	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.692		
nu star	318.4		
A-D Test Statistic	0.327	Nonparametric Statistics	
5% A-D Critical Value	0.748	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.748	Mean	7.367
5% K-S Critical Value	0.154	SD	3.927
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.638
		95% KM (t) UCL	8.444
Assuming Gamma Distribution		95% KM (z) UCL	8.417
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	8.382
Minimum	0.000001	95% KM (bootstrap t) UCL	8.487
Maximum	19.8	95% KM (BCA) UCL	8.6
Mean	6.906	95% KM (Percentile Bootstrap) UCL	8.527
Median	6	95% KM (Chebyshev) UCL	10.15
SD	4.6	97.5% KM (Chebyshev) UCL	11.35
k star	0.287	99% KM (Chebyshev) UCL	13.72
Theta star	24.03		
Nu star	22.42	Potential UCLs to Use	
AppChi2	12.65	95% KM (BCA) UCL	8.6
95% Gamma Approximate UCL (Use when n >= 40)	12.24		
95% Adjusted Gamma UCL (Use when n < 40)	12.52		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - NORTH WATERFRONT SUBSURFACE SOIL

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - North Waterfr
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
ALUMINUM	
General Statistics	
Number of Valid Observations	39
Number of Distinct Observations	39
Raw Statistics	Log-transformed Statistics
Minimum	2430
Maximum	18200
Mean	6424
Geometric Mean	5493
Median	5810
SD	4026
Std. Error of Mean	644.7
Coefficient of Variation	0.627
Skewness	1.612
Relevant UCL Statistics	
Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.813
Shapiro Wilk Critical Value	0.939
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution	Assuming Lognormal Distribution
95% Student's-t UCL	7511
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL
95% Adjusted-CLT UCL (Chen-1995)	7663
95% Modified-t UCL (Johnson-1978)	7539
Gamma Distribution Test	Data Distribution
k star (bias corrected)	3.109
Theta Star	2066
MLE of Mean	6424
MLE of Standard Deviation	3643
nu star	242.5
Approximate Chi Square Value (.05)	207.5
Adjusted Level of Significance	0.0437
Adjusted Chi Square Value	206.2
Anderson-Darling Test Statistic	0.847
Anderson-Darling 5% Critical Value	0.754
Kolmogorov-Smirnov Test Statistic	0.111
Kolmogorov-Smirnov 5% Critical Value	0.142
Data follow Appr. Gamma Distribution at 5% Significance Level	
Assuming Gamma Distribution	Nonparametric Statistics
95% Approximate Gamma UCL (Use when n >= 40)	7510
95% Adjusted Gamma UCL (Use when n < 40)	7556
Potential UCL to Use	Use 95% Approximate Gamma UCL
	7510
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.	
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)	
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.	

PROUCL OUTPUT - NORTH WATERFRONT SUBSURFACE SOIL

ARSENIC					
General Statistics					
Number of Valid Observations		39	Number of Distinct Observations		32
Raw Statistics			Log-transformed Statistics		
Minimum		2.7	Minimum of Log Data		0.993
Maximum		16.6	Maximum of Log Data		2.809
Mean		6.089	Mean of log Data		1.676
Geometric Mean		5.346	SD of log Data		0.494
Median		4.6			
SD		3.526			
Std. Error of Mean		0.565			
Coefficient of Variation		0.579			
Skewness		1.585			
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.803	Shapiro Wilk Test Statistic		0.925
Shapiro Wilk Critical Value		0.939	Shapiro Wilk Critical Value		0.939
Data not Normal at 5% Significance Level			Data not Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		7.041	95% H-UCL		7.038
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		8.186
95% Adjusted-CLT UCL (Chen-1995)		7.171	97.5% Chebyshev (MVUE) UCL		9.125
95% Modified-t UCL (Johnson-1978)		7.065	99% Chebyshev (MVUE) UCL		10.97
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		3.709	Data do not follow a Discernable Distribution (0.05)		
Theta Star		1.642			
MLE of Mean		6.089			
MLE of Standard Deviation		3.162			
nu star		289.3			
Approximate Chi Square Value (.05)		250.9	Nonparametric Statistics		
Adjusted Level of Significance		0.0437	95% CLT UCL		7.018
Adjusted Chi Square Value		249.5	95% Jackknife UCL		7.041
			95% Standard Bootstrap UCL		7.012
Anderson-Darling Test Statistic		1.293	95% Bootstrap-t UCL		7.28
Anderson-Darling 5% Critical Value		0.753	95% Hall's Bootstrap UCL		7.224
Kolmogorov-Smirnov Test Statistic		0.166	95% Percentile Bootstrap UCL		7.017
Kolmogorov-Smirnov 5% Critical Value		0.142	95% BCA Bootstrap UCL		7.222
Data not Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		8.55
			97.5% Chebyshev(Mean, Sd) UCL		9.615
			99% Chebyshev(Mean, Sd) UCL		11.71
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		7.021			
95% Adjusted Gamma UCL (Use when n < 40)		7.06			
Potential UCL to Use			Use 95% Student's-t UCL		7.041
			or 95% Modified-t UCL		7.065
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)					
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

PROUCL OUTPUT - NORTH WATERFRONT SUBSURFACE SOIL

CHROMIUM					
General Statistics					
Number of Valid Observations		39	Number of Distinct Observations		36
Raw Statistics			Log-transformed Statistics		
Minimum		2.2	Minimum of Log Data		0.788
Maximum		27.1	Maximum of Log Data		3.3
Mean		9.552	Mean of log Data		2.071
Geometric Mean		7.936	SD of log Data		0.624
Median		8.77			
SD		6.042			
Std. Error of Mean		0.967			
Coefficient of Variation		0.633			
Skewness		1.246			
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.884	Shapiro Wilk Test Statistic		0.978
Shapiro Wilk Critical Value		0.939	Shapiro Wilk Critical Value		0.939
Data not Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		11.18	95% H-UCL		11.82
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		14.06
95% Adjusted-CLT UCL (Chen-1995)		11.35	97.5% Chebyshev (MVUE) UCL		15.99
95% Modified-t UCL (Johnson-1978)		11.21	99% Chebyshev (MVUE) UCL		19.79
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		2.652	Data appear Gamma Distributed at 5% Significance Level		
Theta Star		3.602			
MLE of Mean		9.552			
MLE of Standard Deviation		5.865			
nu star		206.8			
Approximate Chi Square Value (.05)		174.6	Nonparametric Statistics		
Adjusted Level of Significance		0.0437	95% CLT UCL		11.14
Adjusted Chi Square Value		173.4	95% Jackknife UCL		11.18
			95% Standard Bootstrap UCL		11.13
Anderson-Darling Test Statistic		0.31	95% Bootstrap-t UCL		11.49
Anderson-Darling 5% Critical Value		0.755	95% Hall's Bootstrap UCL		11.41
Kolmogorov-Smirnov Test Statistic		0.0682	95% Percentile Bootstrap UCL		11.22
Kolmogorov-Smirnov 5% Critical Value		0.142	95% BCA Bootstrap UCL		11.17
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		13.77
			97.5% Chebyshev(Mean, Sd) UCL		15.59
			99% Chebyshev(Mean, Sd) UCL		19.18
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		11.32			
95% Adjusted Gamma UCL (Use when n < 40)		11.39			
Potential UCL to Use			Use 95% Approximate Gamma UCL		11.32
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)					
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

PROUCL OUTPUT - NORTH WATERFRONT SUBSURFACE SOIL

IRON						
General Statistics						
Number of Valid Observations		39	Number of Distinct Observations		37	
Raw Statistics			Log-transformed Statistics			
Minimum		6970	Minimum of Log Data		8.849	
Maximum		43100	Maximum of Log Data		10.67	
Mean		17596	Mean of log Data		9.66	
Geometric Mean		15677	SD of log Data		0.477	
Median		16200				
SD		9220				
Std. Error of Mean		1476				
Coefficient of Variation		0.524				
Skewness		1.398				
Relevant UCL Statistics						
Normal Distribution Test			Lognormal Distribution Test			
Shapiro Wilk Test Statistic		0.853	Shapiro Wilk Test Statistic		0.961	
Shapiro Wilk Critical Value		0.939	Shapiro Wilk Critical Value		0.939	
Data not Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level			
Assuming Normal Distribution			Assuming Lognormal Distribution			
95% Student's-t UCL		20085	95% H-UCL		20343	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		23583	
95% Adjusted-CLT UCL (Chen-1995)		20378	97.5% Chebyshev (MVUE) UCL		26213	
95% Modified-t UCL (Johnson-1978)		20140	99% Chebyshev (MVUE) UCL		31378	
Gamma Distribution Test			Data Distribution			
k star (bias corrected)		4.161	Data appear Gamma Distributed at 5% Significance Level			
Theta Star		4229				
MLE of Mean		17596				
MLE of Standard Deviation		8626				
nu star		324.6				
Approximate Chi Square Value (.05)		283.8	Nonparametric Statistics			
Adjusted Level of Significance		0.0437	95% CLT UCL		20025	
Adjusted Chi Square Value		282.3	95% Jackknife UCL		20085	
			95% Standard Bootstrap UCL		19975	
Anderson-Darling Test Statistic		0.604	95% Bootstrap-t UCL		20648	
Anderson-Darling 5% Critical Value		0.752	95% Hall's Bootstrap UCL		20487	
Kolmogorov-Smirnov Test Statistic		0.122	95% Percentile Bootstrap UCL		20164	
Kolmogorov-Smirnov 5% Critical Value		0.142	95% BCA Bootstrap UCL		20308	
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		24032	
			97.5% Chebyshev(Mean, Sd) UCL		26816	
			99% Chebyshev(Mean, Sd) UCL		32286	
Assuming Gamma Distribution						
95% Approximate Gamma UCL (Use when n >= 40)		20122				
95% Adjusted Gamma UCL (Use when n < 40)		20229				
Potential UCL to Use			Use 95% Approximate Gamma UCL			20122
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.						

PROUCL OUTPUT - NORTH WATERFRONT SUBSURFACE SOIL

MANGANESE					
General Statistics					
Number of Valid Observations			39	Number of Distinct Observations	
				38	
Raw Statistics			Log-transformed Statistics		
Minimum			55.4	Minimum of Log Data	
Maximum			549	Maximum of Log Data	
Mean			210.1	Mean of log Data	
Geometric Mean			175.7	SD of log Data	
Median			173		
SD			123.4		
Std. Error of Mean			19.76		
Coefficient of Variation			0.588		
Skewness			0.735		
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic			0.914	Shapiro Wilk Test Statistic	
Shapiro Wilk Critical Value			0.939	Shapiro Wilk Critical Value	
Data not Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL			243.4	95% H-UCL	
95% UCLs (Adjusted for Skewness)				95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)			245.1	97.5% Chebyshev (MVUE) UCL	
95% Modified-t UCL (Johnson-1978)			243.8	99% Chebyshev (MVUE) UCL	
Gamma Distribution Test			Data Distribution		
k star (bias corrected)			2.745	Data appear Gamma Distributed at 5% Significance Level	
Theta Star			76.53		
MLE of Mean			210.1		
MLE of Standard Deviation			126.8		
nu star			214.1		
Approximate Chi Square Value (.05)			181.2	Nonparametric Statistics	
Adjusted Level of Significance			0.0437	95% CLT UCL	
Adjusted Chi Square Value			180	95% Jackknife UCL	
				95% Standard Bootstrap UCL	
Anderson-Darling Test Statistic			0.601	95% Bootstrap-t UCL	
Anderson-Darling 5% Critical Value			0.755	95% Hall's Bootstrap UCL	
Kolmogorov-Smirnov Test Statistic			0.111	95% Percentile Bootstrap UCL	
Kolmogorov-Smirnov 5% Critical Value			0.142	95% BCA Bootstrap UCL	
Data appear Gamma Distributed at 5% Significance Level				95% Chebyshev(Mean, Sd) UCL	
				97.5% Chebyshev(Mean, Sd) UCL	
Assuming Gamma Distribution				99% Chebyshev(Mean, Sd) UCL	
95% Approximate Gamma UCL (Use when n >= 40)			248.1		
95% Adjusted Gamma UCL (Use when n < 40)			249.8		
Potential UCL to Use				Use 95% Approximate Gamma UCL	
				248.1	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)					
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

Central Shipyard
Unpaved Surface Soil

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

User Selected Options		General UCL Statistics for Data Sets with Non-Detects	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Surface Soil - Central Shipyard.		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
BENZO(A)ANTHRACENE			
General Statistics			
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
		Percent Non-Detects	66.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	140	Minimum Detected	4.942
Maximum Detected	410	Maximum Detected	6.016
Mean of Detected	275	Mean of Detected	5.479
SD of Detected	190.9	SD of Detected	0.76
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	400	Maximum Non-Detect	5.991
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	5
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	83.33%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	210.8	Mean	5.282
SD	99.47	SD	0.378
95% DL/2 (t) UCL	292.7	95% H-Stat (DL/2) UCL	315.4
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

BENZO(A)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	185
5% K-S Critical Value	N/A	SD	100.6
Data not Gamma Distributed at 5% Significance Level		SE of Mean	58.09
		95% KM (t) UCL	302.1
Assuming Gamma Distribution		95% KM (z) UCL	280.6
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	396.1
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	410
Mean	N/A	95% KM (Percentile Bootstrap) UCL	410
Median	N/A	95% KM (Chebyshev) UCL	438.2
SD	N/A	97.5% KM (Chebyshev) UCL	547.8
k star	N/A	99% KM (Chebyshev) UCL	763
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	302.1
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	410
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

BENZO(A)PYRENE			
General Statistics			
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
		Percent Non-Detects	66.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	86	Minimum Detected	4.454
Maximum Detected	140	Maximum Detected	4.942
Mean of Detected	113	Mean of Detected	4.698
SD of Detected	38.18	SD of Detected	0.345
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	400	Maximum Non-Detect	5.991
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	6
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	156.8	Mean	5.022
SD	39.73	SD	0.301
95% DL/2 (t) UCL	189.5	95% H-Stat (DL/2) UCL	214.2
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

BENZO(A)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	113
5% K-S Critical Value	N/A	SD	27
Data not Gamma Distributed at 5% Significance Level		SE of Mean	27
		95% KM (t) UCL	167.4
Assuming Gamma Distribution		95% KM (z) UCL	157.4
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	183.2
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	140
Mean	N/A	95% KM (Percentile Bootstrap) UCL	140
Median	N/A	95% KM (Chebyshev) UCL	230.7
SD	N/A	97.5% KM (Chebyshev) UCL	281.6
k star	N/A	99% KM (Chebyshev) UCL	381.6
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	167.4
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	140
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Warning: Recommended UCL exceeds the maximum observation			
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

BENZO(B)FLUORANTHENE			
General Statistics			
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
		Percent Non-Detects	66.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	230	Minimum Detected	5.438
Maximum Detected	410	Maximum Detected	6.016
Mean of Detected	320	Mean of Detected	5.727
SD of Detected	127.3	SD of Detected	0.409
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	400	Maximum Non-Detect	5.991
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	5
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	83.33%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	225.8	Mean	5.365
SD	93.24	SD	0.341
95% DL/2 (t) UCL	302.5	95% H-Stat (DL/2) UCL	321.6
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

BENZO(B)FLUORANTHENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	260
5% K-S Critical Value	N/A	SD	67.08
Data not Gamma Distributed at 5% Significance Level		SE of Mean	38.73
		95% KM (t) UCL	338
Assuming Gamma Distribution		95% KM (z) UCL	323.7
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	400.7
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	410
Mean	N/A	95% KM (Percentile Bootstrap) UCL	410
Median	N/A	95% KM (Chebyshev) UCL	428.8
SD	N/A	97.5% KM (Chebyshev) UCL	501.9
k star	N/A	99% KM (Chebyshev) UCL	645.4
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	338
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	410
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

CHRYSENE			
General Statistics			
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
		Percent Non-Detects	66.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	120	Minimum Detected	4.787
Maximum Detected	420	Maximum Detected	6.04
Mean of Detected	270	Mean of Detected	5.414
SD of Detected	212.1	SD of Detected	0.886
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	400	Maximum Non-Detect	5.991
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	5
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	83.33%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	209.2	Mean	5.26
SD	106.6	SD	0.418
95% DL/2 (t) UCL	296.8	95% H-Stat (DL/2) UCL	332.6
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

CHRYSENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	170
5% K-S Critical Value	N/A	SD	111.8
Data not Gamma Distributed at 5% Significance Level		SE of Mean	64.55
		95% KM (t) UCL	300.1
Assuming Gamma Distribution		95% KM (z) UCL	276.2
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	404.5
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	420
Mean	N/A	95% KM (Percentile Bootstrap) UCL	420
Median	N/A	95% KM (Chebyshev) UCL	451.4
SD	N/A	97.5% KM (Chebyshev) UCL	573.1
k star	N/A	99% KM (Chebyshev) UCL	812.3
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	300.1
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	420
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Surface Soil - Central Shipyard..
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
ALUMINUM	
General Statistics	
Number of Valid Observations	6
Number of Distinct Observations	6
Raw Statistics	Log-transformed Statistics
Minimum	5820
Maximum	13200
Mean	10850
Geometric Mean	10400
Median	12400
SD	3098
Std. Error of Mean	1265
Coefficient of Variation	0.286
Skewness	-1.146
<p>Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!</p> <p>It is suggested to collect at least 8 to 10 observations using these statistical methods!</p> <p>If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.</p>	
<p>Warning: There are only 6 Values in this data</p> <p>Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions</p> <p>The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.</p>	
Relevant UCL Statistics	
Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.795
Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level
Assuming Normal Distribution	Assuming Lognormal Distribution
95% Student's-t UCL	13399
95% UCLs (Adjusted for Skewness)	95% H-UCL
95% Adjusted-CLT UCL (Chen-1995)	12298
95% Modified-t UCL (Johnson-1978)	13300
	95% Chebyshev (MVUE) UCL
	17433
	97.5% Chebyshev (MVUE) UCL
	20260
	99% Chebyshev (MVUE) UCL
	25813

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

ALUMINUM (Continued)			
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	6.09	Data appear Normal at 5% Significance Level	
Theta Star	1782		
MLE of Mean	10850		
MLE of Standard Deviation	4397		
nu star	73.08		
Approximate Chi Square Value (.05)	54.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	12931
Adjusted Chi Square Value	48.62	95% Jackknife UCL	13399
		95% Standard Bootstrap UCL	12709
Anderson-Darling Test Statistic	0.738	95% Bootstrap-t UCL	12802
Anderson-Darling 5% Critical Value	0.698	95% Hall's Bootstrap UCL	12124
Kolmogorov-Smirnov Test Statistic	0.351	95% Percentile Bootstrap UCL	12800
Kolmogorov-Smirnov 5% Critical Value	0.332	95% BCA Bootstrap UCL	12467
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	16364
		97.5% Chebyshev(Mean, Sd) UCL	18749
		99% Chebyshev(Mean, Sd) UCL	23436
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	14577		
95% Adjusted Gamma UCL (Use when n < 40)	16309		
Potential UCL to Use		Use 95% Student's-t UCL	13399
Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			
Note: For highly negative-skewed data, confidence limits			
(e.g., Chen, Johnson, Lognormal, and Gamma) may not be			
reliable. Chen's and Johnson's methods provide			
adjustments for positively skewed data sets.			

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

ARSENIC				
General Statistics				
Number of Valid Observations		6	Number of Distinct Observations	
			6	
Raw Statistics			Log-transformed Statistics	
Minimum		3.9	Minimum of Log Data	
			1.361	
Maximum		24.4	Maximum of Log Data	
			3.195	
Mean		16.16	Mean of log Data	
			2.561	
Geometric Mean		12.95	SD of log Data	
			0.819	
Median		19.7		
SD		9.169		
Std. Error of Mean		3.743		
Coefficient of Variation		0.567		
Skewness		-0.774		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!				
It is suggested to collect at least 8 to 10 observations using these statistical methods!				
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
Warning: There are only 6 Values in this data				
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions				
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.				
Relevant UCL Statistics				
Normal Distribution Test			Lognormal Distribution Test	
Shapiro Wilk Test Statistic		0.811	Shapiro Wilk Test Statistic	
			0.767	
Shapiro Wilk Critical Value		0.788	Shapiro Wilk Critical Value	
			0.788	
Data appear Normal at 5% Significance Level			Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution			Assuming Lognormal Distribution	
95% Student's-t UCL		23.7	95% H-UCL	
			66	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL	
			41.43	
95% Adjusted-CLT UCL (Chen-1995)		21.05	97.5% Chebyshev (MVUE) UCL	
			52.03	
95% Modified-t UCL (Johnson-1978)		23.5	99% Chebyshev (MVUE) UCL	
			72.84	
Gamma Distribution Test			Data Distribution	
k star (bias corrected)		1.318	Data appear Normal at 5% Significance Level	
Theta Star		12.26		
MLE of Mean		16.16		
MLE of Standard Deviation		14.07		
nu star		15.82		
Approximate Chi Square Value (.05)		7.833	Nonparametric Statistics	
Adjusted Level of Significance		0.0122	95% CLT UCL	
Adjusted Chi Square Value		5.92		
			22.32	
			95% Jackknife UCL	
			23.7	
			95% Standard Bootstrap UCL	
			21.7	
Anderson-Darling Test Statistic		0.77	95% Bootstrap-t UCL	
			22.14	
Anderson-Darling 5% Critical Value		0.703	95% Hall's Bootstrap UCL	
			19.9	
Kolmogorov-Smirnov Test Statistic		0.357	95% Percentile Bootstrap UCL	
			21.82	
Kolmogorov-Smirnov 5% Critical Value		0.335	95% BCA Bootstrap UCL	
			21.05	
Data not Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL	
			32.47	
			97.5% Chebyshev(Mean, Sd) UCL	
			39.53	
			99% Chebyshev(Mean, Sd) UCL	
			53.4	
Assuming Gamma Distribution				
95% Approximate Gamma UCL (Use when n >= 40)		32.63		
95% Adjusted Gamma UCL (Use when n < 40)		43.17		
Potential UCL to Use			Use 95% Student's-t UCL	
			23.7	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.				
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.				
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.				

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

CHROMIUM					
General Statistics					
Number of Valid Observations			6	Number of Distinct Observations	
				6	
Raw Statistics			Log-transformed Statistics		
Minimum			9.8	Minimum of Log Data	
				2.282	
Maximum			18.2	Maximum of Log Data	
				2.901	
Mean			14.53	Mean of log Data	
				2.652	
Geometric Mean			14.18	SD of log Data	
				0.25	
Median			15.7		
SD			3.353		
Std. Error of Mean			1.369		
Coefficient of Variation			0.231		
Skewness			-0.684		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 6 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic			0.883	Shapiro Wilk Test Statistic	
				0.858	
Shapiro Wilk Critical Value			0.788	Shapiro Wilk Critical Value	
				0.788	
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL			17.29	95% H-UCL	
				18.59	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		
				21.03	
95% Adjusted-CLT UCL (Chen-1995)			16.38	97.5% Chebyshev (MVUE) UCL	
				23.83	
95% Modified-t UCL (Johnson-1978)			17.23	99% Chebyshev (MVUE) UCL	
				29.34	
Gamma Distribution Test			Data Distribution		
k star (bias corrected)			10.31	Data appear Normal at 5% Significance Level	
Theta Star			1.41		
MLE of Mean			14.53		
MLE of Standard Deviation			4.527		
nu star			123.7		
Approximate Chi Square Value (.05)			99.01	Nonparametric Statistics	
Adjusted Level of Significance			0.0122	95% CLT UCL	
Adjusted Chi Square Value			91.04		
				16.78	
				95% Jackknife UCL	
				17.29	
				95% Standard Bootstrap UCL	
				16.59	
Anderson-Darling Test Statistic			0.527	95% Bootstrap-t UCL	
				17.15	
Anderson-Darling 5% Critical Value			0.697	95% Hall's Bootstrap UCL	
				16.05	
Kolmogorov-Smirnov Test Statistic			0.321	95% Percentile Bootstrap UCL	
				16.67	
Kolmogorov-Smirnov 5% Critical Value			0.332	95% BCA Bootstrap UCL	
				16.37	
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		
				20.5	
				97.5% Chebyshev(Mean, Sd) UCL	
				23.08	
				99% Chebyshev(Mean, Sd) UCL	
				28.15	
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)			18.16		
95% Adjusted Gamma UCL (Use when n < 40)			19.75		
Potential UCL to Use			Use 95% Student's-t UCL		
				17.29	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.					

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

COBALT						
General Statistics						
Number of Valid Observations		6	Number of Distinct Observations		5	
Raw Statistics			Log-transformed Statistics			
Minimum		7.6	Minimum of Log Data		2.028	
Maximum		14.7	Maximum of Log Data		2.688	
Mean		12.04	Mean of log Data		2.457	
Geometric Mean		11.67	SD of log Data		0.282	
Median		13.3				
SD		3.082				
Std. Error of Mean		1.258				
Coefficient of Variation		0.256				
Skewness		-0.739				
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!						
It is suggested to collect at least 8 to 10 observations using these statistical methods!						
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.						
Warning: There are only 6 Values in this data						
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions						
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.						
Relevant UCL Statistics						
Normal Distribution Test			Lognormal Distribution Test			
Shapiro Wilk Test Statistic		0.832	Shapiro Wilk Test Statistic		0.823	
Shapiro Wilk Critical Value		0.788	Shapiro Wilk Critical Value		0.788	
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level			
Assuming Normal Distribution			Assuming Lognormal Distribution			
95% Student's-t UCL		14.58	95% H-UCL		16.02	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		18.12	
95% Adjusted-CLT UCL (Chen-1995)		13.71	97.5% Chebyshev (MVUE) UCL		20.74	
95% Modified-t UCL (Johnson-1978)		14.51	99% Chebyshev (MVUE) UCL		25.89	
Gamma Distribution Test			Data Distribution			
k star (bias corrected)		8.228	Data appear Normal at 5% Significance Level			
Theta Star		1.463				
MLE of Mean		12.04				
MLE of Standard Deviation		4.198				
nu star		98.74				
Approximate Chi Square Value (.05)		76.81	Nonparametric Statistics			
Adjusted Level of Significance		0.0122	95% CLT UCL		14.11	
Adjusted Chi Square Value		69.85	95% Jackknife UCL		14.58	
			95% Standard Bootstrap UCL		13.92	
Anderson-Darling Test Statistic		0.601	95% Bootstrap-t UCL		14.25	
Anderson-Darling 5% Critical Value		0.698	95% Hall's Bootstrap UCL		13.34	
Kolmogorov-Smirnov Test Statistic		0.295	95% Percentile Bootstrap UCL		13.77	
Kolmogorov-Smirnov 5% Critical Value		0.332	95% BCA Bootstrap UCL		13.59	
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		17.53	
			97.5% Chebyshev(Mean, Sd) UCL		19.9	
Assuming Gamma Distribution			99% Chebyshev(Mean, Sd) UCL		24.56	
95% Approximate Gamma UCL (Use when n >= 40)		15.48				
95% Adjusted Gamma UCL (Use when n < 40)		17.02				
Potential UCL to Use			Use 95% Student's-t UCL			14.58
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.						
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.						

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

IRON			
General Statistics			
Number of Valid Observations		6	Number of Distinct Observations
			6
Raw Statistics		Log-transformed Statistics	
Minimum	18500	Minimum of Log Data	9.826
Maximum	32500	Maximum of Log Data	10.39
Mean	28033	Mean of log Data	10.22
Geometric Mean	27463	SD of log Data	0.23
Median	31100		
SD	5783		
Std. Error of Mean	2361		
Coefficient of Variation	0.206		
Skewness	-1.208		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!			
It is suggested to collect at least 8 to 10 observations using these statistical methods!			
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
Warning: There are only 6 Values in this data			
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions			
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.782	Shapiro Wilk Test Statistic	0.768
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	32791	95% H-UCL	35062
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	39583
95% Adjusted-CLT UCL (Chen-1995)	30672	97.5% Chebyshev (MVUE) UCL	44563
95% Modified-t UCL (Johnson-1978)	32597	99% Chebyshev (MVUE) UCL	54345
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	12.36	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2269		
MLE of Mean	28033		
MLE of Standard Deviation	7975		
nu star	148.3		
Approximate Chi Square Value (.05)	121.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	31917
Adjusted Chi Square Value	112.3	95% Jackknife UCL	32791
		95% Standard Bootstrap UCL	31506
Anderson-Darling Test Statistic	0.79	95% Bootstrap-t UCL	31600
Anderson-Darling 5% Critical Value	0.697	95% Hall's Bootstrap UCL	30430
Kolmogorov-Smirnov Test Statistic	0.383	95% Percentile Bootstrap UCL	31600
Kolmogorov-Smirnov 5% Critical Value	0.332	95% BCA Bootstrap UCL	31367
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	38324
		97.5% Chebyshev(Mean, Sd) UCL	42777
		99% Chebyshev(Mean, Sd) UCL	51524
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	34315		
95% Adjusted Gamma UCL (Use when n < 40)	37027		
Potential UCL to Use		Use 95% Student's-t UCL	32791
		or 95% Modified-t UCL	32597
Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.			

PROUCL OUTPUT - CENTRAL SHIPYARD UNPAVED SURFACE SOIL

MANGANESE					
General Statistics					
Number of Valid Observations			6	Number of Distinct Observations	
				6	
Raw Statistics			Log-transformed Statistics		
Minimum			297.5	Minimum of Log Data	
				5.695	
Maximum			448	Maximum of Log Data	
				6.105	
Mean			380.9	Mean of log Data	
				5.93	
Geometric Mean			376.1	SD of log Data	
				0.175	
Median			385		
SD			65.3		
Std. Error of Mean			26.66		
Coefficient of Variation			0.171		
Skewness			-0.171		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 6 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic			0.877	Shapiro Wilk Test Statistic	
				0.882	
Shapiro Wilk Critical Value			0.788	Shapiro Wilk Critical Value	
				0.788	
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL			434.6	95% H-UCL	
				448	
95% UCLs (Adjusted for Skewness)				95% Chebyshev (MVUE) UCL	
				499.8	
95% Adjusted-CLT UCL (Chen-1995)			422.8	97.5% Chebyshev (MVUE) UCL	
				551.2	
95% Modified-t UCL (Johnson-1978)			434.3	99% Chebyshev (MVUE) UCL	
				652.1	
Gamma Distribution Test			Data Distribution		
k star (bias corrected)			20.02	Data appear Normal at 5% Significance Level	
Theta Star			19.03		
MLE of Mean			380.9		
MLE of Standard Deviation			85.14		
nu star			240.2		
Approximate Chi Square Value (.05)			205.3	Nonparametric Statistics	
Adjusted Level of Significance			0.0122	95% CLT UCL	
Adjusted Chi Square Value			193.6	424.8	
				95% Jackknife UCL	
				434.6	
				95% Standard Bootstrap UCL	
				420.5	
Anderson-Darling Test Statistic			0.442	95% Bootstrap-t UCL	
				434.3	
Anderson-Darling 5% Critical Value			0.697	95% Hall's Bootstrap UCL	
				408.7	
Kolmogorov-Smirnov Test Statistic			0.256	95% Percentile Bootstrap UCL	
				421.5	
Kolmogorov-Smirnov 5% Critical Value			0.332	95% BCA Bootstrap UCL	
				418.4	
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		
				497.1	
				97.5% Chebyshev(Mean, Sd) UCL	
				547.4	
				99% Chebyshev(Mean, Sd) UCL	
				646.1	
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)			445.6		
95% Adjusted Gamma UCL (Use when n < 40)			472.6		
Potential UCL to Use			Use 95% Student's-t UCL		
				434.6	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.					

Central Shipyard

Surface Soil

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

User Selected Options		General UCL Statistics for Data Sets with Non-Detects	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Surface Soil - Central Shipyard..		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
BENZO(A)ANTHRACENE			
General Statistics			
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
		Percent Non-Detects	66.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	140	Minimum Detected	4.942
Maximum Detected	410	Maximum Detected	6.016
Mean of Detected	275	Mean of Detected	5.479
SD of Detected	190.9	SD of Detected	0.76
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	400	Maximum Non-Detect	5.991
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	5
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	83.33%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	210.8	Mean	5.282
SD	99.47	SD	0.378
95% DL/2 (t) UCL	292.7	95% H-Stat (DL/2) UCL	315.4
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

BENZO(A)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	185
5% K-S Critical Value	N/A	SD	100.6
Data not Gamma Distributed at 5% Significance Level		SE of Mean	58.09
		95% KM (t) UCL	302.1
Assuming Gamma Distribution		95% KM (z) UCL	280.6
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	396.1
Minimum	N/A	95% KM (bootstrap t) UCL	185
Maximum	N/A	95% KM (BCA) UCL	N/A
Mean	N/A	95% KM (Percentile Bootstrap) UCL	410
Median	N/A	95% KM (Chebyshev) UCL	438.2
SD	N/A	97.5% KM (Chebyshev) UCL	547.8
k star	N/A	99% KM (Chebyshev) UCL	763
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	302.1
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	410
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

BENZO(A)PYRENE			
General Statistics			
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
		Percent Non-Detects	66.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	86	Minimum Detected	4.454
Maximum Detected	140	Maximum Detected	4.942
Mean of Detected	113	Mean of Detected	4.698
SD of Detected	38.18	SD of Detected	0.345
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	400	Maximum Non-Detect	5.991
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	6
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	156.8	Mean	5.022
SD	39.73	SD	0.301
95% DL/2 (t) UCL	189.5	95% H-Stat (DL/2) UCL	214.2
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

BENZO(A)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	113
5% K-S Critical Value	N/A	SD	27
Data not Gamma Distributed at 5% Significance Level		SE of Mean	27
		95% KM (t) UCL	167.4
Assuming Gamma Distribution		95% KM (z) UCL	157.4
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	183.2
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	N/A
Mean	N/A	95% KM (Percentile Bootstrap) UCL	140
Median	N/A	95% KM (Chebyshev) UCL	230.7
SD	N/A	97.5% KM (Chebyshev) UCL	281.6
k star	N/A	99% KM (Chebyshev) UCL	381.6
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	167.4
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	140
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Warning: Recommended UCL exceeds the maximum observation			
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

BENZO(B)FLUORANTHENE			
General Statistics			
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
		Percent Non-Detects	66.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	230	Minimum Detected	5.438
Maximum Detected	410	Maximum Detected	6.016
Mean of Detected	320	Mean of Detected	5.727
SD of Detected	127.3	SD of Detected	0.409
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	400	Maximum Non-Detect	5.991
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	5
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	83.33%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	225.8	Mean	5.365
SD	93.24	SD	0.341
95% DL/2 (t) UCL	302.5	95% H-Stat (DL/2) UCL	321.6
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

BENZO(B)FLUORANTHENE (Continued)				
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only		
	k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
	Theta Star	N/A		
	nu star	N/A		
	A-D Test Statistic	N/A	Nonparametric Statistics	
	5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
	K-S Test Statistic	N/A	Mean	260
	5% K-S Critical Value	N/A	SD	67.08
Data not Gamma Distributed at 5% Significance Level			SE of Mean	38.73
			95% KM (t) UCL	338
Assuming Gamma Distribution			95% KM (z) UCL	323.7
Gamma ROS Statistics using Extrapolated Data			95% KM (jackknife) UCL	400.7
	Minimum	N/A	95% KM (bootstrap t) UCL	N/A
	Maximum	N/A	95% KM (BCA) UCL	410
	Mean	N/A	95% KM (Percentile Bootstrap) UCL	410
	Median	N/A	95% KM (Chebyshev) UCL	428.8
	SD	N/A	97.5% KM (Chebyshev) UCL	501.9
	k star	N/A	99% KM (Chebyshev) UCL	645.4
	Theta star	N/A		
	Nu star	N/A	Potential UCLs to Use	
	AppChi2	N/A	95% KM (t) UCL	338
	95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	410
	95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.				
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.				
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).				
For additional insight, the user may want to consult a statistician.				

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

CHRYSENE			
General Statistics			
Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
		Percent Non-Detects	66.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	120	Minimum Detected	4.787
Maximum Detected	420	Maximum Detected	6.04
Mean of Detected	270	Mean of Detected	5.414
SD of Detected	212.1	SD of Detected	0.886
Minimum Non-Detect	330	Minimum Non-Detect	5.799
Maximum Non-Detect	400	Maximum Non-Detect	5.991
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	5
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	83.33%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	209.2	Mean	5.26
SD	106.6	SD	0.418
95% DL/2 (t) UCL	296.8	95% H-Stat (DL/2) UCL	332.6
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

CHRYSENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	170
5% K-S Critical Value	N/A	SD	111.8
Data not Gamma Distributed at 5% Significance Level		SE of Mean	64.55
		95% KM (t) UCL	300.1
Assuming Gamma Distribution		95% KM (z) UCL	276.2
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	404.5
Minimum	N/A	95% KM (bootstrap t) UCL	170
Maximum	N/A	95% KM (BCA) UCL	420
Mean	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Median	N/A	95% KM (Chebyshev) UCL	451.4
SD	N/A	97.5% KM (Chebyshev) UCL	573.1
k star	N/A	99% KM (Chebyshev) UCL	812.3
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	300.1
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	N/A
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Surface Soil - Central Shipyard..
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
ALUMINUM	
General Statistics	
Number of Valid Observations	6
Number of Distinct Observations	6
Raw Statistics	Log-transformed Statistics
Minimum	5820
Maximum	13200
Mean	10850
Geometric Mean	10400
Median	12400
SD	3098
Std. Error of Mean	1265
Coefficient of Variation	0.286
Skewness	-1.146
<p>Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!</p> <p>It is suggested to collect at least 8 to 10 observations using these statistical methods!</p> <p>If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.</p>	
<p>Warning: There are only 6 Values in this data</p> <p>Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions</p> <p>The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.</p>	
Relevant UCL Statistics	
Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.795
Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level
Assuming Normal Distribution	Assuming Lognormal Distribution
95% Student's-t UCL	13399
95% UCLs (Adjusted for Skewness)	95% H-UCL
95% Adjusted-CLT UCL (Chen-1995)	12298
95% Modified-t UCL (Johnson-1978)	13300
	95% Chebyshev (MVUE) UCL
	17433
	97.5% Chebyshev (MVUE) UCL
	20260
	99% Chebyshev (MVUE) UCL
	25813

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

ALUMINUM (Continued)			
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	6.09	Data appear Normal at 5% Significance Level	
Theta Star	1782		
MLE of Mean	10850		
MLE of Standard Deviation	4397		
nu star	73.08		
Approximate Chi Square Value (.05)	54.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	12931
Adjusted Chi Square Value	48.62	95% Jackknife UCL	13399
		95% Standard Bootstrap UCL	12736
Anderson-Darling Test Statistic	0.738	95% Bootstrap-t UCL	12836
Anderson-Darling 5% Critical Value	0.698	95% Hall's Bootstrap UCL	12135
Kolmogorov-Smirnov Test Statistic	0.351	95% Percentile Bootstrap UCL	12733
Kolmogorov-Smirnov 5% Critical Value	0.332	95% BCA Bootstrap UCL	12400
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	16364
		97.5% Chebyshev(Mean, Sd) UCL	18749
		99% Chebyshev(Mean, Sd) UCL	23436
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	14577		
95% Adjusted Gamma UCL (Use when n < 40)	16309		
Potential UCL to Use		Use 95% Student's-t UCL	13399
Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			
Note: For highly negative-skewed data, confidence limits			
(e.g., Chen, Johnson, Lognormal, and Gamma) may not be			
reliable. Chen's and Johnson's methods provide			
adjustments for positively skewed data sets.			

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

ARSENIC					
General Statistics					
Number of Valid Observations			6	Number of Distinct Observations	
				6	
Raw Statistics			Log-transformed Statistics		
Minimum			3.9	Minimum of Log Data	
				1.361	
Maximum			24.4	Maximum of Log Data	
				3.195	
Mean			16.16	Mean of log Data	
				2.561	
Geometric Mean			12.95	SD of log Data	
				0.819	
Median			19.7		
SD			9.169		
Std. Error of Mean			3.743		
Coefficient of Variation			0.567		
Skewness			-0.774		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 6 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic			0.811	Shapiro Wilk Test Statistic	
				0.767	
Shapiro Wilk Critical Value			0.788	Shapiro Wilk Critical Value	
				0.788	
Data appear Normal at 5% Significance Level			Data not Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL			23.7	95% H-UCL	
				66	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		
				41.43	
95% Adjusted-CLT UCL (Chen-1995)			21.05	97.5% Chebyshev (MVUE) UCL	
				52.03	
95% Modified-t UCL (Johnson-1978)			23.5	99% Chebyshev (MVUE) UCL	
				72.84	
Gamma Distribution Test			Data Distribution		
k star (bias corrected)			1.318	Data appear Normal at 5% Significance Level	
Theta Star			12.26		
MLE of Mean			16.16		
MLE of Standard Deviation			14.07		
nu star			15.82		
Approximate Chi Square Value (.05)			7.833	Nonparametric Statistics	
Adjusted Level of Significance			0.0122	95% CLT UCL	
Adjusted Chi Square Value			5.92	22.32	
				95% Jackknife UCL	
				23.7	
				95% Standard Bootstrap UCL	
				21.88	
Anderson-Darling Test Statistic			0.77	95% Bootstrap-t UCL	
				22.04	
Anderson-Darling 5% Critical Value			0.703	95% Hall's Bootstrap UCL	
				19.95	
Kolmogorov-Smirnov Test Statistic			0.357	95% Percentile Bootstrap UCL	
				21.77	
Kolmogorov-Smirnov 5% Critical Value			0.335	95% BCA Bootstrap UCL	
				21.1	
Data not Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		
				32.47	
				97.5% Chebyshev(Mean, Sd) UCL	
				39.53	
				99% Chebyshev(Mean, Sd) UCL	
				53.4	
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)			32.63		
95% Adjusted Gamma UCL (Use when n < 40)			43.17		
Potential UCL to Use			Use 95% Student's-t UCL		
				23.7	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.					

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

CHROMIUM				
General Statistics				
Number of Valid Observations		6	Number of Distinct Observations	
			6	
Raw Statistics		Log-transformed Statistics		
Minimum	9.8	Minimum of Log Data	2.282	
Maximum	18.2	Maximum of Log Data	2.901	
Mean	14.53	Mean of log Data	2.652	
Geometric Mean	14.18	SD of log Data	0.25	
Median	15.7			
SD	3.353			
Std. Error of Mean	1.369			
Coefficient of Variation	0.231			
Skewness	-0.684			
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!				
It is suggested to collect at least 8 to 10 observations using these statistical methods!				
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
Warning: There are only 6 Values in this data				
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions				
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.				
Relevant UCL Statistics				
Normal Distribution Test		Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.883	Shapiro Wilk Test Statistic	0.858	
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788	
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution		Assuming Lognormal Distribution		
95% Student's-t UCL	17.29	95% H-UCL	18.59	
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	21.03	
95% Adjusted-CLT UCL (Chen-1995)	16.38	97.5% Chebyshev (MVUE) UCL	23.83	
95% Modified-t UCL (Johnson-1978)	17.23	99% Chebyshev (MVUE) UCL	29.34	
Gamma Distribution Test		Data Distribution		
k star (bias corrected)	10.31	Data appear Normal at 5% Significance Level		
Theta Star	1.41			
MLE of Mean	14.53			
MLE of Standard Deviation	4.527			
nu star	123.7			
Approximate Chi Square Value (.05)	99.01	Nonparametric Statistics		
Adjusted Level of Significance	0.0122	95% CLT UCL	16.78	
Adjusted Chi Square Value	91.04	95% Jackknife UCL	17.29	
		95% Standard Bootstrap UCL	16.61	
Anderson-Darling Test Statistic	0.527	95% Bootstrap-t UCL	17.04	
Anderson-Darling 5% Critical Value	0.697	95% Hall's Bootstrap UCL	16.02	
Kolmogorov-Smirnov Test Statistic	0.321	95% Percentile Bootstrap UCL	16.53	
Kolmogorov-Smirnov 5% Critical Value	0.332	95% BCA Bootstrap UCL	16.3	
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	20.5	
		97.5% Chebyshev(Mean, Sd) UCL	23.08	
		99% Chebyshev(Mean, Sd) UCL	28.15	
Assuming Gamma Distribution				
95% Approximate Gamma UCL (Use when n >= 40)	18.16			
95% Adjusted Gamma UCL (Use when n < 40)	19.75			
Potential UCL to Use		Use 95% Student's-t UCL		
			17.29	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.				
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.				
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.				

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

COBALT						
General Statistics						
Number of Valid Observations			6	Number of Distinct Observations		
				5		
Raw Statistics				Log-transformed Statistics		
Minimum			7.6	Minimum of Log Data		
Maximum			14.7	Maximum of Log Data		
Mean			12.04	Mean of log Data		
Geometric Mean			11.67	SD of log Data		
Median			13.3			
SD			3.082			
Std. Error of Mean			1.258			
Coefficient of Variation			0.256			
Skewness			-0.739			
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!						
It is suggested to collect at least 8 to 10 observations using these statistical methods!						
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.						
Warning: There are only 6 Values in this data						
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions						
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.						
Relevant UCL Statistics						
Normal Distribution Test				Lognormal Distribution Test		
Shapiro Wilk Test Statistic			0.832	Shapiro Wilk Test Statistic		
Shapiro Wilk Critical Value			0.788	Shapiro Wilk Critical Value		
Data appear Normal at 5% Significance Level				Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution				Assuming Lognormal Distribution		
95% Student's-t UCL			14.58	95% H-UCL		
95% UCLs (Adjusted for Skewness)				95% Chebyshev (MVUE) UCL		
95% Adjusted-CLT UCL (Chen-1995)			13.71	97.5% Chebyshev (MVUE) UCL		
95% Modified-t UCL (Johnson-1978)			14.51	99% Chebyshev (MVUE) UCL		
Gamma Distribution Test				Data Distribution		
k star (bias corrected)			8.228	Data appear Normal at 5% Significance Level		
Theta Star			1.463			
MLE of Mean			12.04			
MLE of Standard Deviation			4.198			
nu star			98.74			
Approximate Chi Square Value (.05)			76.81	Nonparametric Statistics		
Adjusted Level of Significance			0.0122	95% CLT UCL		
Adjusted Chi Square Value			69.85	95% Jackknife UCL		
				95% Standard Bootstrap UCL		
Anderson-Darling Test Statistic			0.601	95% Bootstrap-t UCL		
Anderson-Darling 5% Critical Value			0.698	95% Hall's Bootstrap UCL		
Kolmogorov-Smirnov Test Statistic			0.295	95% Percentile Bootstrap UCL		
Kolmogorov-Smirnov 5% Critical Value			0.332	95% BCA Bootstrap UCL		
Data appear Gamma Distributed at 5% Significance Level				95% Chebyshev(Mean, Sd) UCL		
				97.5% Chebyshev(Mean, Sd) UCL		
				99% Chebyshev(Mean, Sd) UCL		
Assuming Gamma Distribution						
95% Approximate Gamma UCL (Use when n >= 40)			15.48			
95% Adjusted Gamma UCL (Use when n < 40)			17.02			
Potential UCL to Use				Use 95% Student's-t UCL		
				14.58		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.						
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.						

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

IRON			
General Statistics			
Number of Valid Observations		6	Number of Distinct Observations
			6
Raw Statistics		Log-transformed Statistics	
	Minimum	18500	Minimum of Log Data
	Maximum	32500	Maximum of Log Data
	Mean	28033	Mean of log Data
	Geometric Mean	27463	SD of log Data
	Median	31100	
	SD	5783	
	Std. Error of Mean	2361	
	Coefficient of Variation	0.206	
	Skewness	-1.208	
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!			
It is suggested to collect at least 8 to 10 observations using these statistical methods!			
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
Warning: There are only 6 Values in this data			
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions			
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
	Shapiro Wilk Test Statistic	0.782	Shapiro Wilk Test Statistic
	Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
	95% Student's-t UCL	32791	95% H-UCL
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL
	95% Adjusted-CLT UCL (Chen-1995)	30672	97.5% Chebyshev (MVUE) UCL
	95% Modified-t UCL (Johnson-1978)	32597	99% Chebyshev (MVUE) UCL
Gamma Distribution Test		Data Distribution	
	k star (bias corrected)	12.36	Data do not follow a Discernable Distribution (0.05)
	Theta Star	2269	
	MLE of Mean	28033	
	MLE of Standard Deviation	7975	
	nu star	148.3	
	Approximate Chi Square Value (.05)	121.1	Nonparametric Statistics
	Adjusted Level of Significance	0.0122	95% CLT UCL
	Adjusted Chi Square Value	112.3	95% Jackknife UCL
	Anderson-Darling Test Statistic	0.79	95% Standard Bootstrap UCL
	Anderson-Darling 5% Critical Value	0.697	95% Bootstrap-t UCL
	Kolmogorov-Smirnov Test Statistic	0.383	95% Hall's Bootstrap UCL
	Kolmogorov-Smirnov 5% Critical Value	0.332	95% Percentile Bootstrap UCL
Data not Gamma Distributed at 5% Significance Level			95% BCA Bootstrap UCL
Assuming Gamma Distribution			95% Chebyshev(Mean, Sd) UCL
	95% Approximate Gamma UCL (Use when n >= 40)	34315	97.5% Chebyshev(Mean, Sd) UCL
	95% Adjusted Gamma UCL (Use when n < 40)	37027	99% Chebyshev(Mean, Sd) UCL
Potential UCL to Use			
			Use 95% Student's-t UCL
			or 95% Modified-t UCL
Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.			

PROUCL OUTPUT - CENTRAL SHIPYARD SURFACE SOIL

MANGANESE					
General Statistics					
Number of Valid Observations			6	Number of Distinct Observations	
				6	
Raw Statistics			Log-transformed Statistics		
Minimum			297.5	Minimum of Log Data	
				5.695	
Maximum			448	Maximum of Log Data	
				6.105	
Mean			380.9	Mean of log Data	
				5.93	
Geometric Mean			376.1	SD of log Data	
				0.175	
Median			385		
SD			65.3		
Std. Error of Mean			26.66		
Coefficient of Variation			0.171		
Skewness			-0.171		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 6 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic			0.877	Shapiro Wilk Test Statistic	
				0.882	
Shapiro Wilk Critical Value			0.788	Shapiro Wilk Critical Value	
				0.788	
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL			434.6	95% H-UCL	
				448	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		
				499.8	
95% Adjusted-CLT UCL (Chen-1995)			422.8	97.5% Chebyshev (MVUE) UCL	
				551.2	
95% Modified-t UCL (Johnson-1978)			434.3	99% Chebyshev (MVUE) UCL	
				652.1	
Gamma Distribution Test			Data Distribution		
k star (bias corrected)			20.02	Data appear Normal at 5% Significance Level	
Theta Star			19.03		
MLE of Mean			380.9		
MLE of Standard Deviation			85.14		
nu star			240.2		
Approximate Chi Square Value (.05)			205.3	Nonparametric Statistics	
Adjusted Level of Significance			0.0122	95% CLT UCL	
Adjusted Chi Square Value			193.6	424.8	
				95% Jackknife UCL	
				434.6	
				95% Standard Bootstrap UCL	
				420.5	
Anderson-Darling Test Statistic			0.442	95% Bootstrap-t UCL	
				432.6	
Anderson-Darling 5% Critical Value			0.697	95% Hall's Bootstrap UCL	
				409.2	
Kolmogorov-Smirnov Test Statistic			0.256	95% Percentile Bootstrap UCL	
				421.5	
Kolmogorov-Smirnov 5% Critical Value			0.332	95% BCA Bootstrap UCL	
				421.5	
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		
				497.1	
				97.5% Chebyshev(Mean, Sd) UCL	
				547.4	
				99% Chebyshev(Mean, Sd) UCL	
				646.1	
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)			445.6		
95% Adjusted Gamma UCL (Use when n < 40)			472.6		
Potential UCL to Use			Use 95% Student's-t UCL		
				434.6	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.					

Central Shipyard

Subsurface Soil

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

General UCL Statistics for Data Sets with Non-Detects			
User Selected Options			
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - Central Shipyard		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
BENZO(A)ANTHRACENE			
General Statistics			
Number of Valid Data	25	Number of Detected Data	10
Number of Distinct Detected Data	10	Number of Non-Detect Data	15
Number of Missing Values	19	Percent Non-Detects	60.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	47	Minimum Detected	3.85
Maximum Detected	1300	Maximum Detected	7.17
Mean of Detected	253.7	Mean of Detected	4.938
SD of Detected	381.8	SD of Detected	1.02
Minimum Non-Detect	340	Minimum Non-Detect	5.829
Maximum Non-Detect	4000	Maximum Non-Detect	8.294
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	25
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.579	Shapiro Wilk Test Statistic	0.88
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	294.1	Mean	5.244
SD	426.8	SD	0.82
95% DL/2 (t) UCL	440.1	95% H-Stat (DL/2) UCL	388.2
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	4.778
		SD in Log Scale	0.694
		Mean in Original Scale	169.4
		SD in Original Scale	246
		95% t UCL	253.6
		95% Percentile Bootstrap UCL	259.9
		95% BCA Bootstrap UCL	303.1
		95% H-UCL	204.7

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

BENZO(A)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.745	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	340.6		
nu star	14.9		
A-D Test Statistic	0.926	Nonparametric Statistics	
5% A-D Critical Value	0.749	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.749	Mean	177.7
5% K-S Critical Value	0.274	SD	251.8
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean	58.52
		95% KM (t) UCL	277.8
Assuming Gamma Distribution		95% KM (z) UCL	273.9
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	276.5
Minimum	0.000001	95% KM (bootstrap t) UCL	403.1
Maximum	1300	95% KM (BCA) UCL	284.6
Mean	204	95% KM (Percentile Bootstrap) UCL	278
Median	168	95% KM (Chebyshev) UCL	432.8
SD	253.2	97.5% KM (Chebyshev) UCL	543.1
k star	0.357	99% KM (Chebyshev) UCL	760
Theta star	571.7		
Nu star	17.84	Potential UCLs to Use	
AppChi2	9.276	95% KM (t) UCL	277.8
95% Gamma Approximate UCL (Use when n >= 40)	392.4		
95% Adjusted Gamma UCL (Use when n < 40)	411		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

BENZO(A)PYRENE			
General Statistics			
Number of Valid Data	25	Number of Detected Data	11
Number of Distinct Detected Data	11	Number of Non-Detect Data	14
Number of Missing Values	19	Percent Non-Detects	56.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	42	Minimum Detected	3.738
Maximum Detected	690	Maximum Detected	6.537
Mean of Detected	170.7	Mean of Detected	4.699
SD of Detected	198.9	SD of Detected	0.91
Minimum Non-Detect	340	Minimum Non-Detect	5.829
Maximum Non-Detect	4000	Maximum Non-Detect	8.294
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	25
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.69	Shapiro Wilk Test Statistic	0.888
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	257.1	Mean	5.113
SD	385.7	SD	0.838
95% DL/2 (t) UCL	389.1	95% H-Stat (DL/2) UCL	349.8
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	4.571
		SD in Log Scale	0.648
		Mean in Original Scale	126.7
		SD in Original Scale	136.3
		95% t UCL	173.3
		95% Percentile Bootstrap UCL	175.5
		95% BCA Bootstrap UCL	192.4
		95% H-UCL	157.3
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.987	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	172.9		
nu star	21.72		
A-D Test Statistic	0.824	Nonparametric Statistics	
5% A-D Critical Value	0.746	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.746	Mean	133.7
5% K-S Critical Value	0.261	SD	144.9
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean	35.47
Assuming Gamma Distribution		95% KM (t) UCL	194.4
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	192
Minimum	4.315	95% KM (jackknife) UCL	194.3
Maximum	690	95% KM (bootstrap t) UCL	244.3
Mean	149.5	95% KM (BCA) UCL	194.6
Median	120.9	95% KM (Percentile Bootstrap) UCL	194.1
SD	141.3	95% KM (Chebyshev) UCL	288.3
k star	1.257	97.5% KM (Chebyshev) UCL	355.2
Theta star	118.9	99% KM (Chebyshev) UCL	486.6
Nu star	62.84	Potential UCLs to Use	
AppChi2	45.6	95% KM (t) UCL	194.4
95% Gamma Approximate UCL (Use when n >= 40)	206		
95% Adjusted Gamma UCL (Use when n < 40)	210.6		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

BENZO(B)FLUORANTHENE			
General Statistics			
Number of Valid Data	25	Number of Detected Data	11
Number of Distinct Detected Data	11	Number of Non-Detect Data	14
Number of Missing Values	19	Percent Non-Detects	56.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	63	Minimum Detected	4.143
Maximum Detected	910	Maximum Detected	6.813
Mean of Detected	227.7	Mean of Detected	5.024
SD of Detected	257.8	SD of Detected	0.867
Minimum Non-Detect	340	Minimum Non-Detect	5.829
Maximum Non-Detect	4000	Maximum Non-Detect	8.294
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	25
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.684	Shapiro Wilk Test Statistic	0.888
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	282.2	Mean	5.256
SD	395.4	SD	0.757
95% DL/2 (t) UCL	417.5	95% H-Stat (DL/2) UCL	359.3
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	4.882
		SD in Log Scale	0.617
		Mean in Original Scale	169.2
		SD in Original Scale	176.7
		95% t UCL	229.7
		95% Percentile Bootstrap UCL	231.6
		95% BCA Bootstrap UCL	254.8
		95% H-UCL	207.1
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.065	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	213.8		
nu star	23.44		
A-D Test Statistic	0.798	Nonparametric Statistics	
5% A-D Critical Value	0.744	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.744	Mean	173.5
5% K-S Critical Value	0.26	SD	182.6
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean	43.04
Assuming Gamma Distribution		95% KM (t) UCL	247.1
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	244.2
Minimum	17.77	95% KM (jackknife) UCL	246.8
Maximum	910	95% KM (bootstrap t) UCL	314.1
Mean	197.5	95% KM (BCA) UCL	254.7
Median	170	95% KM (Percentile Bootstrap) UCL	245
SD	181.9	95% KM (Chebyshev) UCL	361.1
k star	1.475	97.5% KM (Chebyshev) UCL	442.2
Theta star	133.9	99% KM (Chebyshev) UCL	601.7
Nu star	73.76	Potential UCLs to Use	
AppChi2	54.98	95% KM (t) UCL	247.1
95% Gamma Approximate UCL (Use when n >= 40)	264.9		
95% Adjusted Gamma UCL (Use when n < 40)	270.3		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

CHRYSENE			
General Statistics			
Number of Valid Data	25	Number of Detected Data	12
Number of Distinct Detected Data	12	Number of Non-Detect Data	13
Number of Missing Values	19	Percent Non-Detects	52.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	51	Minimum Detected	3.932
Maximum Detected	1300	Maximum Detected	7.17
Mean of Detected	247.5	Mean of Detected	4.965
SD of Detected	354.6	SD of Detected	0.965
Minimum Non-Detect	340	Minimum Non-Detect	5.829
Maximum Non-Detect	4000	Maximum Non-Detect	8.294
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	25
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.588	Shapiro Wilk Test Statistic	0.875
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	296.2	Mean	5.233
SD	429.6	SD	0.841
95% DL/2 (t) UCL	443.2	95% H-Stat (DL/2) UCL	396.3
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	4.828
		SD in Log Scale	0.702
		Mean in Original Scale	178.6
		SD in Original Scale	250.6
		95% t UCL	264.3
		95% Percentile Bootstrap UCL	272.1
		95% BCA Bootstrap UCL	337.2
		95% H-UCL	217.4
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.844	Data appear Lognormal at 5% Significance Level	
Theta Star	293.3		
nu star	20.25		
A-D Test Statistic	1.083	Nonparametric Statistics	
5% A-D Critical Value	0.756	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.756	Mean	184.3
5% K-S Critical Value	0.252	SD	255.7
Data not Gamma Distributed at 5% Significance Level		SE of Mean	57.33
Assuming Gamma Distribution		95% KM (t) UCL	282.4
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	278.6
Minimum	0.000001	95% KM (jackknife) UCL	281.2
Maximum	1300	95% KM (bootstrap t) UCL	432.9
Mean	207	95% KM (BCA) UCL	291.8
Median	160.9	95% KM (Percentile Bootstrap) UCL	283.6
SD	254	95% KM (Chebyshev) UCL	434.2
k star	0.533	97.5% KM (Chebyshev) UCL	542.3
Theta star	388.4	99% KM (Chebyshev) UCL	754.7
Nu star	26.64	Potential UCLs to Use	
AppChi2	15.88	95% KM (t) UCL	282.4
95% Gamma Approximate UCL (Use when n >= 40)	347.4	95% KM (% Bootstrap) UCL	283.6
95% Adjusted Gamma UCL (Use when n < 40)	360.2		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

DIBENZO(A,H)ANTHRACENE			
General Statistics			
Number of Valid Data	19	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	18
Number of Missing Values	25	Percent Non-Detects	94.74%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable DIBENZO(A,H)ANTHRACENE was not processed!			
INDENO(1,2,3-CD)PYRENE			
General Statistics			
Number of Valid Data	22	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	18
Number of Missing Values	22	Percent Non-Detects	81.82%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	62	Minimum Detected	4.127
Maximum Detected	240	Maximum Detected	5.481
Mean of Detected	127	Mean of Detected	4.685
SD of Detected	83.43	SD of Detected	0.647
Minimum Non-Detect	340	Minimum Non-Detect	5.829
Maximum Non-Detect	4000	Maximum Non-Detect	8.294
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	22
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There are only 4 Distinct Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.869	Shapiro Wilk Test Statistic	0.889
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	269.9	Mean	5.292
SD	389.5	SD	0.629
95% DL/2 (t) UCL	412.8	95% H-Stat (DL/2) UCL	324.4
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	4.685
		SD in Log Scale	0.411
		Mean in Original Scale	117.5
		SD in Original Scale	50
		95% t UCL	135.8
		95% Percentile Bootstrap UCL	134.7
		95% BCA Bootstrap UCL	137.3
		95% H-UCL	140

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

INDENO(1,2,3-CD)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.99	Data appear Normal at 5% Significance Level	
Theta Star	128.3		
nu star	7.921		
A-D Test Statistic	0.39	Nonparametric Statistics	
5% A-D Critical Value	0.659	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.659	Mean	127
5% K-S Critical Value	0.396	SD	72.26
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	41.72
		95% KM (t) UCL	198.8
Assuming Gamma Distribution		95% KM (z) UCL	195.6
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	208
Minimum	50.95	95% KM (bootstrap t) UCL	259.1
Maximum	240	95% KM (BCA) UCL	206.7
Mean	126.8	95% KM (Percentile Bootstrap) UCL	205.2
Median	126.5	95% KM (Chebyshev) UCL	308.8
SD	53.83	97.5% KM (Chebyshev) UCL	387.5
k star	4.594	99% KM (Chebyshev) UCL	542.1
Theta star	27.6		
Nu star	202.1	Potential UCLs to Use	
AppChi2	170.3	95% KM (t) UCL	198.8
95% Gamma Approximate UCL (Use when n >= 40)	150.5	95% KM (Percentile Bootstrap) UCL	205.2
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

ARSENIC			
General Statistics			
Number of Valid Data	44	Number of Detected Data	43
Number of Distinct Detected Data	35	Number of Non-Detect Data	1
		Percent Non-Detects	2.27%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	3.9	Minimum Detected	1.361
Maximum Detected	37.3	Maximum Detected	3.619
Mean of Detected	16.72	Mean of Detected	2.703
SD of Detected	7.419	SD of Detected	0.519
Minimum Non-Detect	4.1	Minimum Non-Detect	1.411
Maximum Non-Detect	4.1	Maximum Non-Detect	1.411
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.944	Shapiro Wilk Test Statistic	0.916
5% Shapiro Wilk Critical Value	0.943	5% Shapiro Wilk Critical Value	0.943
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	16.39	Mean	2.657
SD	7.658	SD	0.594
95% DL/2 (t) UCL	18.33	95% H-Stat (DL/2) UCL	20.34
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	16.29	Mean in Log Scale	2.677
SD	7.784	SD in Log Scale	0.54
95% MLE (t) UCL	18.26	Mean in Original Scale	16.45
95% MLE (Tiku) UCL	18.25	SD in Original Scale	7.545
		95% t UCL	18.36
		95% Percentile Bootstrap UCL	18.35
		95% BCA Bootstrap UCL	18.32
		95% H UCL	19.73
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	4.24	Data appear Normal at 5% Significance Level	
Theta Star	3.944		
nu star	364.6		
A-D Test Statistic	0.972	Nonparametric Statistics	
5% A-D Critical Value	0.753	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.753	Mean	16.43
5% K-S Critical Value	0.135	SD	7.496
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.143
Assuming Gamma Distribution		95% KM (t) UCL	18.35
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	18.31
Minimum	0.000001	95% KM (jackknife) UCL	18.34
Maximum	37.3	95% KM (bootstrap t) UCL	18.59
Mean	16.34	95% KM (BCA) UCL	18.33
Median	16.55	95% KM (Percentile Bootstrap) UCL	18.22
SD	7.753	95% KM (Chebyshev) UCL	21.41
k star	1.144	97.5% KM (Chebyshev) UCL	23.57
Theta star	14.29	99% KM (Chebyshev) UCL	27.81
Nu star	100.7	Potential UCLs to Use	
AppChi2	78.51	95% KM (t) UCL	18.35
95% Gamma Approximate UCL (Use when n >= 40)	20.95	95% KM (Percentile Bootstrap) UCL	18.22
95% Adjusted Gamma UCL (Use when n < 40)	21.13		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - Central Shipyard
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
ALUMINUM	
General Statistics	
Number of Valid Observations	27
Number of Missing Values	17
Number of Distinct Observations	25
Raw Statistics	
Minimum	4820
Maximum	14300
Mean	9448
Geometric Mean	9148
Median	9950
SD	2335
Std. Error of Mean	449.3
Coefficient of Variation	0.247
Skewness	-0.102
Log-transformed Statistics	
Minimum of Log Data	8.481
Maximum of Log Data	9.568
Mean of log Data	9.121
SD of log Data	0.266
Relevant UCL Statistics	
Normal Distribution Test	
Shapiro Wilk Test Statistic	0.974
Shapiro Wilk Critical Value	0.923
Data appear Normal at 5% Significance Level	
Assuming Normal Distribution	
95% Student's-t UCL	10214
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	10177
95% Modified-t UCL (Johnson-1978)	10213
Gamma Distribution Test	
k star (bias corrected)	13.96
Theta Star	676.8
MLE of Mean	9448
MLE of Standard Deviation	2529
nu star	753.8
Approximate Chi Square Value (.05)	691.1
Adjusted Level of Significance	0.0401
Adjusted Chi Square Value	687.3
Anderson-Darling Test Statistic	0.53
Anderson-Darling 5% Critical Value	0.744
Kolmogorov-Smirnov Test Statistic	0.14
Kolmogorov-Smirnov 5% Critical Value	0.168
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
95% Approximate Gamma UCL (Use when n >= 40)	10305
95% Adjusted Gamma UCL (Use when n < 40)	10362
Potential UCL to Use	
Nonparametric Statistics	
95% CLT UCL	10187
95% Jackknife UCL	10214
95% Standard Bootstrap UCL	10173
95% Bootstrap-t UCL	10271
95% Hall's Bootstrap UCL	10208
95% Percentile Bootstrap UCL	10143
95% BCA Bootstrap UCL	10149
95% Chebyshev(Mean, Sd) UCL	11406
97.5% Chebyshev(Mean, Sd) UCL	12254
99% Chebyshev(Mean, Sd) UCL	13919
Use 95% Student's-t UCL	
10214	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.	
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.	

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

CHROMIUM						
General Statistics						
Number of Valid Observations		44	Number of Distinct Observations		30	
Raw Statistics			Log-transformed Statistics			
Minimum		6.3	Minimum of Log Data		1.841	
Maximum		22	Maximum of Log Data		3.091	
Mean		12.48	Mean of log Data		2.49	
Geometric Mean		12.07	SD of log Data		0.268	
Median		13				
SD		3.225				
Std. Error of Mean		0.486				
Coefficient of Variation		0.258				
Skewness		0.439				
Relevant UCL Statistics						
Normal Distribution Test			Lognormal Distribution Test			
Shapiro Wilk Test Statistic		0.969	Shapiro Wilk Test Statistic		0.966	
Shapiro Wilk Critical Value		0.944	Shapiro Wilk Critical Value		0.944	
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level			
Assuming Normal Distribution			Assuming Lognormal Distribution			
95% Student's-t UCL		13.3	95% H-UCL		13.43	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		14.73	
95% Adjusted-CLT UCL (Chen-1995)		13.32	97.5% Chebyshev (MVUE) UCL		15.69	
95% Modified-t UCL (Johnson-1978)		13.3	99% Chebyshev (MVUE) UCL		17.59	
Gamma Distribution Test			Data Distribution			
k star (bias corrected)		13.96	Data appear Normal at 5% Significance Level			
Theta Star		0.894				
MLE of Mean		12.48				
MLE of Standard Deviation		3.34				
nu star		1229				
Approximate Chi Square Value (.05)		1148	Nonparametric Statistics			
Adjusted Level of Significance		0.0445	95% CLT UCL		13.28	
Adjusted Chi Square Value		1146	95% Jackknife UCL		13.3	
			95% Standard Bootstrap UCL		13.26	
Anderson-Darling Test Statistic		0.529	95% Bootstrap-t UCL		13.33	
Anderson-Darling 5% Critical Value		0.748	95% Hall's Bootstrap UCL		13.34	
Kolmogorov-Smirnov Test Statistic		0.119	95% Percentile Bootstrap UCL		13.24	
Kolmogorov-Smirnov 5% Critical Value		0.133	95% BCA Bootstrap UCL		13.31	
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		14.6	
			97.5% Chebyshev(Mean, Sd) UCL		15.52	
Assuming Gamma Distribution			99% Chebyshev(Mean, Sd) UCL		17.32	
95% Approximate Gamma UCL (Use when n >= 40)		13.36				
95% Adjusted Gamma UCL (Use when n < 40)		13.39				
Potential UCL to Use			Use 95% Student's-t UCL		13.3	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.						

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

COBALT					
General Statistics					
Number of Valid Observations		27	Number of Distinct Observations		24
Number of Missing Values		17			
Raw Statistics			Log-transformed Statistics		
Minimum		3.9	Minimum of Log Data		1.361
Maximum		20.2	Maximum of Log Data		3.006
Mean		11.05	Mean of log Data		2.341
Geometric Mean		10.39	SD of log Data		0.373
Median		10.6			
SD		3.732			
Std. Error of Mean		0.718			
Coefficient of Variation		0.338			
Skewness		0.403			
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.968	Shapiro Wilk Test Statistic		0.94
Shapiro Wilk Critical Value		0.923	Shapiro Wilk Critical Value		0.923
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		12.27	95% H-UCL		12.78
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		14.68
95% Adjusted-CLT UCL (Chen-1995)		12.29	97.5% Chebyshev (MVUE) UCL		16.22
95% Modified-t UCL (Johnson-1978)		12.28	99% Chebyshev (MVUE) UCL		19.25
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		7.428	Data appear Normal at 5% Significance Level		
Theta Star		1.487			
MLE of Mean		11.05			
MLE of Standard Deviation		4.054			
nu star		401.1			
Approximate Chi Square Value (.05)		355.7	Nonparametric Statistics		
Adjusted Level of Significance		0.0401	95% CLT UCL		12.23
Adjusted Chi Square Value		353	95% Jackknife UCL		12.27
			95% Standard Bootstrap UCL		12.2
Anderson-Darling Test Statistic		0.445	95% Bootstrap-t UCL		12.42
Anderson-Darling 5% Critical Value		0.745	95% Hall's Bootstrap UCL		12.41
Kolmogorov-Smirnov Test Statistic		0.149	95% Percentile Bootstrap UCL		12.24
Kolmogorov-Smirnov 5% Critical Value		0.168	95% BCA Bootstrap UCL		12.2
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		14.18
			97.5% Chebyshev(Mean, Sd) UCL		15.53
			99% Chebyshev(Mean, Sd) UCL		18.19
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		12.46			
95% Adjusted Gamma UCL (Use when n < 40)		12.56			
Potential UCL to Use			Use 95% Student's-t UCL		12.27
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)					
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

IRON			
General Statistics			
Number of Valid Observations	27	Number of Distinct Observations	25
Number of Missing Values	17		
Raw Statistics		Log-transformed Statistics	
Minimum	14300	Minimum of Log Data	9.568
Maximum	40100	Maximum of Log Data	10.6
Mean	24628	Mean of log Data	10.07
Geometric Mean	23667	SD of log Data	0.292
Median	25200		
SD	6914		
Std. Error of Mean	1331		
Coefficient of Variation	0.281		
Skewness	0.242		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.952	Shapiro Wilk Test Statistic	0.938
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	26897	95% H-UCL	27409
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	30798
95% Adjusted-CLT UCL (Chen-1995)	26883	97.5% Chebyshev (MVUE) UCL	33454
95% Modified-t UCL (Johnson-1978)	26908	99% Chebyshev (MVUE) UCL	38671
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	11.34	Data appear Normal at 5% Significance Level	
Theta Star	2172		
MLE of Mean	24628		
MLE of Standard Deviation	7314		
nu star	612.3		
Approximate Chi Square Value (.05)	555.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0401	95% CLT UCL	26816
Adjusted Chi Square Value	552.4	95% Jackknife UCL	26897
		95% Standard Bootstrap UCL	26724
Anderson-Darling Test Statistic	0.575	95% Bootstrap-t UCL	27018
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	26990
Kolmogorov-Smirnov Test Statistic	0.173	95% Percentile Bootstrap UCL	26767
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	26787
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	30428
		97.5% Chebyshev(Mean, Sd) UCL	32938
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	37867
95% Approximate Gamma UCL (Use when n >= 40)	27127		
95% Adjusted Gamma UCL (Use when n < 40)	27295		
Potential UCL to Use		Use 95% Student's-t UCL	26897
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - CENTRAL SHIPYARD SUBSURFACE SOIL

MANGANESE					
General Statistics					
Number of Valid Observations		27	Number of Distinct Observations		27
Number of Missing Values		17			
Raw Statistics			Log-transformed Statistics		
Minimum		86.2	Minimum of Log Data		4.457
Maximum		612	Maximum of Log Data		6.417
Mean		336.2	Mean of log Data		5.71
Geometric Mean		302	SD of log Data		0.513
Median		327			
SD		140.3			
Std. Error of Mean		27			
Coefficient of Variation		0.417			
Skewness		0.0635			
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.958	Shapiro Wilk Test Statistic		0.894
Shapiro Wilk Critical Value		0.923	Shapiro Wilk Critical Value		0.923
Data appear Normal at 5% Significance Level			Data not Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		382.3	95% H-UCL		420.4
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		496.4
95% Adjusted-CLT UCL (Chen-1995)		381	97.5% Chebyshev (MVUE) UCL		563
95% Modified-t UCL (Johnson-1978)		382.3	99% Chebyshev (MVUE) UCL		693.8
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		4.31	Data appear Normal at 5% Significance Level		
Theta Star		78.02			
MLE of Mean		336.2			
MLE of Standard Deviation		162			
nu star		232.7			
Approximate Chi Square Value (.05)		198.4	Nonparametric Statistics		
Adjusted Level of Significance		0.0401	95% CLT UCL		380.6
Adjusted Chi Square Value		196.4	95% Jackknife UCL		382.3
			95% Standard Bootstrap UCL		379.7
Anderson-Darling Test Statistic		0.741	95% Bootstrap-t UCL		386.4
Anderson-Darling 5% Critical Value		0.748	95% Hall's Bootstrap UCL		383.3
Kolmogorov-Smirnov Test Statistic		0.195	95% Percentile Bootstrap UCL		380.6
Kolmogorov-Smirnov 5% Critical Value		0.169	95% BCA Bootstrap UCL		381
Data follow Appr. Gamma Distribution at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		453.9
			97.5% Chebyshev(Mean, Sd) UCL		504.9
			99% Chebyshev(Mean, Sd) UCL		604.9
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		394.4			
95% Adjusted Gamma UCL (Use when n < 40)		398.4			
Potential UCL to Use			Use 95% Student's-t UCL		382.3
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)					
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

Former Building 234
Unpaved Surface Soil

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

General UCL Statistics for Data Sets with Non-Detects	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Unpaved Surface Soil - Building
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
BENZO(A)ANTHRACENE	
General Statistics	
Number of Valid Data	7
Number of Distinct Detected Data	6
Number of Detected Data	6
Number of Non-Detect Data	1
Percent Non-Detects	14.29%
Raw Statistics	
Minimum Detected	60
Maximum Detected	470
Mean of Detected	210
SD of Detected	143.8
Minimum Non-Detect	710
Maximum Non-Detect	710
Log-transformed Statistics	
Minimum Detected	4.094
Maximum Detected	6.153
Mean of Detected	5.151
SD of Detected	0.705
Minimum Non-Detect	6.565
Maximum Non-Detect	6.565
Warning: There are only 6 Detected Values in this data	
Note: It should be noted that even though bootstrap may be performed on this data set	
the resulting calculations may not be reliable enough to draw conclusions	
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.	
UCL Statistics	
Normal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.903
5% Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level	
Assuming Normal Distribution	
DL/2 Substitution Method	
Mean	230.7
SD	142.3
95% DL/2 (t) UCL	335.2
Maximum Likelihood Estimate(MLE) Method	N/A
MLE method failed to converge properly	
Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.991
5% Shapiro Wilk Critical Value	0.788
Data appear Lognormal at 5% Significance Level	
Assuming Lognormal Distribution	
DL/2 Substitution Method	
Mean	5.254
SD	0.699
95% H-Stat (DL/2) UCL	558.3
Log ROS Method	
Mean in Log Scale	5.151
SD in Log Scale	0.643
Mean in Original Scale	204.6
SD in Original Scale	132
95% t UCL	301.6
95% Percentile Bootstrap UCL	284.3
95% BCA Bootstrap UCL	311.4
95% H-UCL	439.1

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

BENZO(A)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.46	Data appear Normal at 5% Significance Level	
Theta Star	143.8		
nu star	17.52		
A-D Test Statistic	0.177	Nonparametric Statistics	
5% A-D Critical Value	0.702	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.702	Mean	210
5% K-S Critical Value	0.335	SD	131.3
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	58.71
		95% KM (t) UCL	324.1
Assuming Gamma Distribution		95% KM (z) UCL	306.6
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	325.7
Minimum	60	95% KM (bootstrap t) UCL	402.4
Maximum	470	95% KM (BCA) UCL	301.7
Mean	210.9	95% KM (Percentile Bootstrap) UCL	306
Median	200	95% KM (Chebyshev) UCL	465.9
SD	131.3	97.5% KM (Chebyshev) UCL	576.6
k star	1.88	99% KM (Chebyshev) UCL	794.1
Theta star	112.2		
Nu star	26.32	Potential UCLs to Use	
AppChi2	15.62	95% KM (t) UCL	324.1
95% Gamma Approximate UCL (Use when n >= 40)	355.2	95% KM (Percentile Bootstrap) UCL	306
95% Adjusted Gamma UCL (Use when n < 40)	420.4		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

BENZO(A)PYRENE			
General Statistics			
Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
		Percent Non-Detects	14.29%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	50	Minimum Detected	3.912
Maximum Detected	410	Maximum Detected	6.016
Mean of Detected	190	Mean of Detected	5.052
SD of Detected	124.1	SD of Detected	0.719
Minimum Non-Detect	710	Minimum Non-Detect	6.565
Maximum Non-Detect	710	Maximum Non-Detect	6.565
Warning: There are only 6 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.912	Shapiro Wilk Test Statistic	0.961
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	213.6	Mean	5.17
SD	129.3	SD	0.726
95% DL/2 (t) UCL	308.5	95% H-Stat (DL/2) UCL	550.9
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	5.052
		SD in Log Scale	0.656
		Mean in Original Scale	185.2
		SD in Original Scale	114
		95% t UCL	268.9
		95% Percentile Bootstrap UCL	255.7
		95% BCA Bootstrap UCL	269
		95% H-UCL	410.7

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

BENZO(A)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.473	Data appear Normal at 5% Significance Level	
Theta Star	129		
nu star	17.68		
A-D Test Statistic	0.238	Nonparametric Statistics	
5% A-D Critical Value	0.702	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.702	Mean	190
5% K-S Critical Value	0.335	SD	113.3
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	50.66
		95% KM (t) UCL	288.4
Assuming Gamma Distribution		95% KM (z) UCL	273.3
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	289.8
Minimum	50	95% KM (bootstrap t) UCL	319.2
Maximum	410	95% KM (BCA) UCL	267.1
Mean	190.8	95% KM (Percentile Bootstrap) UCL	270
Median	195.6	95% KM (Chebyshev) UCL	410.8
SD	113.3	97.5% KM (Chebyshev) UCL	506.4
k star	1.897	99% KM (Chebyshev) UCL	694.1
Theta star	100.6		
Nu star	26.56	Potential UCLs to Use	
AppChi2	15.81	95% KM (t) UCL	288.4
95% Gamma Approximate UCL (Use when n >= 40)	320.5	95% KM (Percentile Bootstrap) UCL	270
95% Adjusted Gamma UCL (Use when n < 40)	378.9		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

BENZO(B)FLUORANTHENE			
General Statistics			
Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
		Percent Non-Detects	14.29%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	66	Minimum Detected	4.19
Maximum Detected	660	Maximum Detected	6.492
Mean of Detected	307.7	Mean of Detected	5.484
SD of Detected	213.6	SD of Detected	0.823
Minimum Non-Detect	710	Minimum Non-Detect	6.565
Maximum Non-Detect	710	Maximum Non-Detect	6.565
Warning: There are only 6 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.957	Shapiro Wilk Test Statistic	0.973
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	314.4	Mean	5.54
SD	195.8	SD	0.766
95% DL/2 (t) UCL	458.3	95% H-Stat (DL/2) UCL	890.7
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	5.484
		SD in Log Scale	0.752
		Mean in Original Scale	298.1
		SD in Original Scale	196.6
		95% t UCL	442.6
		95% Percentile Bootstrap UCL	417.1
		95% BCA Bootstrap UCL	433.1
		95% H-UCL	810.1

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

BENZO(B)FLUORANTHENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.209	Data appear Normal at 5% Significance Level	
Theta Star	254.4		
nu star	14.51		
A-D Test Statistic	0.154	Nonparametric Statistics	
5% A-D Critical Value	0.704	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.704	Mean	307.7
5% K-S Critical Value	0.336	SD	195
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	87.22
		95% KM (t) UCL	477.1
Assuming Gamma Distribution		95% KM (z) UCL	451.1
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	479.5
Minimum	66	95% KM (bootstrap t) UCL	541.7
Maximum	660	95% KM (BCA) UCL	445
Mean	308.2	95% KM (Percentile Bootstrap) UCL	447.7
Median	311.6	95% KM (Chebyshev) UCL	687.8
SD	195	97.5% KM (Chebyshev) UCL	852.3
k star	1.546	99% KM (Chebyshev) UCL	1175
Theta star	199.3		
Nu star	21.65	Potential UCLs to Use	
AppChi2	12.07	95% KM (t) UCL	477.1
95% Gamma Approximate UCL (Use when n >= 40)	552.6	95% KM (Percentile Bootstrap) UCL	447.7
95% Adjusted Gamma UCL (Use when n < 40)	668.1		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

CHRYSENE			
General Statistics			
Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
		Percent Non-Detects	14.29%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	46	Minimum Detected	3.829
Maximum Detected	580	Maximum Detected	6.363
Mean of Detected	261	Mean of Detected	5.297
SD of Detected	185.9	SD of Detected	0.882
Minimum Non-Detect	710	Minimum Non-Detect	6.565
Maximum Non-Detect	710	Maximum Non-Detect	6.565
Warning: There are only 6 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.939	Shapiro Wilk Test Statistic	0.947
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	274.4	Mean	5.379
SD	173.4	SD	0.834
95% DL/2 (t) UCL	401.8	95% H-Stat (DL/2) UCL	927.2
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	5.297
		SD in Log Scale	0.806
		Mean in Original Scale	252.2
		SD in Original Scale	171.3
		95% t UCL	378
		95% Percentile Bootstrap UCL	355.7
		95% BCA Bootstrap UCL	369.9
		95% H-UCL	783.2

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

CHRYSENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.119	Data appear Normal at 5% Significance Level	
Theta Star	233.2		
nu star	13.43		
A-D Test Statistic	0.211	Nonparametric Statistics	
5% A-D Critical Value	0.704	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.704	Mean	261
5% K-S Critical Value	0.336	SD	169.7
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	75.89
		95% KM (t) UCL	408.5
Assuming Gamma Distribution		95% KM (z) UCL	385.8
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	410.6
Minimum	46	95% KM (bootstrap t) UCL	452.1
Maximum	580	95% KM (BCA) UCL	382.9
Mean	261.1	95% KM (Percentile Bootstrap) UCL	382
Median	261.9	95% KM (Chebyshev) UCL	591.8
SD	169.7	97.5% KM (Chebyshev) UCL	734.9
k star	1.427	99% KM (Chebyshev) UCL	1016
Theta star	183		
Nu star	19.97	Potential UCLs to Use	
AppChi2	10.83	95% KM (t) UCL	408.5
95% Gamma Approximate UCL (Use when n >= 40)	481.5	95% KM (Percentile Bootstrap) UCL	382
95% Adjusted Gamma UCL (Use when n < 40)	587.9		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

DIBENZO(A,H)ANTHRACENE			
General Statistics			
Number of Valid Data	6	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	5
Number of Missing Values	1	Percent Non-Detects	83.33%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable DIBENZO(A,H)ANTHRACENE was not processed!			

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

INDENO(1,2,3-CD)PYRENE			
General Statistics			
Number of Valid Data	7	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	3
		Percent Non-Detects	42.86%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	48	Minimum Detected	3.871
Maximum Detected	190	Maximum Detected	5.247
Mean of Detected	117	Mean of Detected	4.628
SD of Detected	64.67	SD of Detected	0.623
Minimum Non-Detect	350	Minimum Non-Detect	5.858
Maximum Non-Detect	1700	Maximum Non-Detect	7.438
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	7
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There are only 4 Distinct Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.952	Shapiro Wilk Test Statistic	0.95
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	264	Mean	5.185
SD	276.5	SD	0.941
95% DL/2 (t) UCL	467	95% H-Stat (DL/2) UCL	1079
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	4.628
		SD in Log Scale	0.44
		Mean in Original Scale	110.7
		SD in Original Scale	46.4
		95% t UCL	144.8
		95% Percentile Bootstrap UCL	137.8
		95% BCA Bootstrap UCL	137.8
		95% H-UCL	171.7

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

INDENO(1,2,3-CD)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.136	Data appear Normal at 5% Significance Level	
Theta Star	103		
nu star	9.089		
A-D Test Statistic	0.273	Nonparametric Statistics	
5% A-D Critical Value	0.659	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.659	Mean	117
5% K-S Critical Value	0.396	SD	56.01
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	32.34
		95% KM (t) UCL	179.8
Assuming Gamma Distribution		95% KM (z) UCL	170.2
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	184.2
Minimum	48	95% KM (bootstrap t) UCL	185.9
Maximum	190	95% KM (BCA) UCL	166
Mean	117.2	95% KM (Percentile Bootstrap) UCL	170
Median	117.4	95% KM (Chebyshev) UCL	258
SD	45.73	97.5% KM (Chebyshev) UCL	318.9
k star	3.907	99% KM (Chebyshev) UCL	438.7
Theta star	29.99		
Nu star	54.69	Potential UCLs to Use	
AppChi2	38.7	95% KM (t) UCL	179.8
95% Gamma Approximate UCL (Use when n >= 40)	165.6	95% KM (Percentile Bootstrap) UCL	170
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

BERYLLIUM			
General Statistics			
Number of Valid Data	6	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	1
Number of Missing Values	1	Percent Non-Detects	16.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.18	Minimum Detected	-1.715
Maximum Detected	3.5	Maximum Detected	1.253
Mean of Detected	0.99	Mean of Detected	-0.627
SD of Detected	1.41	SD of Detected	1.132
Minimum Non-Detect	0.2	Minimum Non-Detect	-1.609
Maximum Non-Detect	0.2	Maximum Non-Detect	-1.609
Warning: There are only 5 Detected Values in this data Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.646	Shapiro Wilk Test Statistic	0.878
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.842	Mean	-0.907
SD	1.312	SD	1.222
95% DL/2 (t) UCL	1.921	95% H-Stat (DL/2) UCL	12.37
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.473	Mean in Log Scale	-0.874
SD	1.58	SD in Log Scale	1.18
95% MLE (t) UCL	1.773	Mean in Original Scale	0.845
95% MLE (Tiku) UCL	1.859	SD in Original Scale	1.31
		95% t UCL	1.923
		95% Percentile Bootstrap UCL	1.864
		95% BCA Bootstrap UCL	1.962
		95% H UCL	10.26

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

BERYLLIUM (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.51	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	1.941		
nu star	5.1		
A-D Test Statistic	0.647	Nonparametric Statistics	
5% A-D Critical Value	0.693	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.693	Mean	0.855
5% K-S Critical Value	0.365	SD	1.19
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean	0.543
		95% KM (t) UCL	1.95
Assuming Gamma Distribution		95% KM (z) UCL	1.748
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.919
Minimum	0.000001	95% KM (bootstrap t) UCL	8.123
Maximum	3.5	95% KM (BCA) UCL	1.945
Mean	0.825	95% KM (Percentile Bootstrap) UCL	1.883
Median	0.365	95% KM (Chebyshev) UCL	3.223
SD	1.324	97.5% KM (Chebyshev) UCL	4.247
k star	0.245	99% KM (Chebyshev) UCL	6.26
Theta star	3.373		
Nu star	2.935	Potential UCLs to Use	
AppChi2	0.353	95% KM (Chebyshev) UCL	3.223
95% Gamma Approximate UCL (Use when n >= 40)	6.852		
95% Adjusted Gamma UCL (Use when n < 40)	15.27		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

CADMIUM			
General Statistics			
Number of Valid Data	7	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	6
		Percent Non-Detects	85.71%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable CADMIUM was not processed!			

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Unpaved Surface Soil - Building
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
ALUMINUM	
General Statistics	
Number of Valid Observations	6
Number of Missing Values	1
Number of Distinct Observations	6
Raw Statistics	
Minimum	3810
Maximum	11300
Mean	7567
Geometric Mean	6951
Median	7630
SD	3245
Std. Error of Mean	1325
Coefficient of Variation	0.429
Skewness	-0.00806
Log-transformed Statistics	
Minimum of Log Data	8.245
Maximum of Log Data	9.333
Mean of log Data	8.847
SD of log Data	0.462
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!	
It is suggested to collect at least 8 to 10 observations using these statistical methods!	
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.	
Warning: There are only 6 Values in this data	
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions	
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.	
Relevant UCL Statistics	
Normal Distribution Test	
Shapiro Wilk Test Statistic	0.848
Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level	
Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.859
Shapiro Wilk Critical Value	0.788
Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution	
95% Student's-t UCL	10236
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	9741
95% Modified-t UCL (Johnson-1978)	10236
Assuming Lognormal Distribution	
95% H-UCL	13084
95% Chebyshev (MVUE) UCL	13814
97.5% Chebyshev (MVUE) UCL	16508
99% Chebyshev (MVUE) UCL	21799

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ALUMINUM (Continued)			
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	3.136	Data appear Normal at 5% Significance Level	
Theta Star	2413		
MLE of Mean	7567		
MLE of Standard Deviation	4273		
nu star	37.63		
Approximate Chi Square Value (.05)	24.59	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	9746
Adjusted Chi Square Value	20.86	95% Jackknife UCL	10236
		95% Standard Bootstrap UCL	9556
Anderson-Darling Test Statistic	0.563	95% Bootstrap-t UCL	10356
Anderson-Darling 5% Critical Value	0.698	95% Hall's Bootstrap UCL	8834
Kolmogorov-Smirnov Test Statistic	0.303	95% Percentile Bootstrap UCL	9605
Kolmogorov-Smirnov 5% Critical Value	0.333	95% BCA Bootstrap UCL	9622
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13342
		97.5% Chebyshev(Mean, Sd) UCL	15841
		99% Chebyshev(Mean, Sd) UCL	20749
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	11582		
95% Adjusted Gamma UCL (Use when n < 40)	13649		
Potential UCL to Use		Use 95% Student's-t UCL	10236
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			
Note: For highly negative-skewed data, confidence limits			
(e.g., Chen, Johnson, Lognormal, and Gamma) may not be			
reliable. Chen's and Johnson's methods provide			
adjustments for positively skewed data sets.			

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ARSENIC				
General Statistics				
Number of Valid Observations		7	Number of Distinct Observations	
7		7		
Raw Statistics		Log-transformed Statistics		
Minimum	2.6	Minimum of Log Data	0.956	
Maximum	23.6	Maximum of Log Data	3.161	
Mean	11.91	Mean of log Data	2.204	
Geometric Mean	9.058	SD of log Data	0.864	
Median	13			
SD	8.172			
Std. Error of Mean	3.089			
Coefficient of Variation	0.686			
Skewness	0.184			
Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!				
It is suggested to collect at least 8 to 10 observations using these statistical methods!				
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
Warning: There are only 7 Values in this data				
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions				
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.				
Relevant UCL Statistics				
Normal Distribution Test		Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.92	Shapiro Wilk Test Statistic	0.903	
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.803	
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution		Assuming Lognormal Distribution		
95% Student's-t UCL	17.92	95% H-UCL	42.45	
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	29.97	
95% Adjusted-CLT UCL (Chen-1995)	17.22	97.5% Chebyshev (MVUE) UCL	37.61	
95% Modified-t UCL (Johnson-1978)	17.95	99% Chebyshev (MVUE) UCL	52.61	
Gamma Distribution Test		Data Distribution		
k star (bias corrected)	1.223	Data appear Normal at 5% Significance Level		
Theta Star	9.738			
MLE of Mean	11.91			
MLE of Standard Deviation	10.77			
nu star	17.13			
Approximate Chi Square Value (.05)	8.764	Nonparametric Statistics		
Adjusted Level of Significance	0.0158	95% CLT UCL	16.99	
Adjusted Chi Square Value	7.034	95% Jackknife UCL	17.92	
		95% Standard Bootstrap UCL	16.66	
Anderson-Darling Test Statistic	0.379	95% Bootstrap-t UCL	18.28	
Anderson-Darling 5% Critical Value	0.715	95% Hall's Bootstrap UCL	16.2	
Kolmogorov-Smirnov Test Statistic	0.213	95% Percentile Bootstrap UCL	16.67	
Kolmogorov-Smirnov 5% Critical Value	0.315	95% BCA Bootstrap UCL	16.41	
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	25.38	
		97.5% Chebyshev(Mean, Sd) UCL	31.2	
		99% Chebyshev(Mean, Sd) UCL	42.65	
Assuming Gamma Distribution				
95% Approximate Gamma UCL (Use when n >= 40)	23.29			
95% Adjusted Gamma UCL (Use when n < 40)	29.01			
Potential UCL to Use		Use 95% Student's-t UCL		
		17.92		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.				
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.				

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CHROMIUM					
General Statistics					
Number of Valid Observations		7	Number of Distinct Observations		7
Raw Statistics			Log-transformed Statistics		
Minimum		6.4	Minimum of Log Data		1.856
Maximum		130	Maximum of Log Data		4.868
Mean		33.86	Mean of log Data		3.033
Geometric Mean		20.76	SD of log Data		0.976
Median		16			
SD		43.72			
Std. Error of Mean		16.52			
Coefficient of Variation		1.291			
Skewness		2.348			
Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 7 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.647	Shapiro Wilk Test Statistic		0.907
Shapiro Wilk Critical Value		0.803	Shapiro Wilk Critical Value		0.803
Data not Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		65.96	95% H-UCL		142
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		80.12
95% Adjusted-CLT UCL (Chen-1995)		76.7	97.5% Chebyshev (MVUE) UCL		101.5
95% Modified-t UCL (Johnson-1978)		68.41	99% Chebyshev (MVUE) UCL		143.6
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		0.758	Data Follow Appr. Gamma Distribution at 5% Significance Level		
Theta Star		44.66			
MLE of Mean		33.86			
MLE of Standard Deviation		38.88			
nu star		10.61			
Approximate Chi Square Value (.05)		4.329	Nonparametric Statistics		
Adjusted Level of Significance		0.0158	95% CLT UCL		61.04
Adjusted Chi Square Value		3.203	95% Jackknife UCL		65.96
			95% Standard Bootstrap UCL		59.13
Anderson-Darling Test Statistic		0.681	95% Bootstrap-t UCL		240.8
Anderson-Darling 5% Critical Value		0.725	95% Hall's Bootstrap UCL		240
Kolmogorov-Smirnov Test Statistic		0.321	95% Percentile Bootstrap UCL		64.14
Kolmogorov-Smirnov 5% Critical Value		0.319	95% BCA Bootstrap UCL		78.91
Data follow Appr. Gamma Distribution at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		105.9
			97.5% Chebyshev(Mean, Sd) UCL		137
			99% Chebyshev(Mean, Sd) UCL		198.3
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		83.01			
95% Adjusted Gamma UCL (Use when n < 40)		112.2			
Potential UCL to Use			Use 95% Approximate Gamma UCL 83.01		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

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COBALT			
General Statistics			
Number of Valid Observations	6	Number of Distinct Observations	6
Number of Missing Values	1		
Raw Statistics		Log-transformed Statistics	
Minimum	3.3	Minimum of Log Data	1.194
Maximum	23.9	Maximum of Log Data	3.174
Mean	12.42	Mean of log Data	2.278
Geometric Mean	9.754	SD of log Data	0.795
Median	10.25		
SD	8.665		
Std. Error of Mean	3.538		
Coefficient of Variation	0.698		
Skewness	0.451		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates! It is suggested to collect at least 8 to 10 observations using these statistical methods! If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.893	Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	19.55	95% H-UCL	45.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	30.24
95% Adjusted-CLT UCL (Chen-1995)	18.93	97.5% Chebyshev (MVUE) UCL	37.88
95% Modified-t UCL (Johnson-1978)	19.65	99% Chebyshev (MVUE) UCL	52.89
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.223	Data appear Normal at 5% Significance Level	
Theta Star	10.15		
MLE of Mean	12.42		
MLE of Standard Deviation	11.23		
nu star	14.68		
Approximate Chi Square Value (.05)	7.038	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	18.24
Adjusted Chi Square Value	5.246	95% Jackknife UCL	19.55
		95% Standard Bootstrap UCL	17.86
Anderson-Darling Test Statistic	0.31	95% Bootstrap-t UCL	21.12
Anderson-Darling 5% Critical Value	0.704	95% Hall's Bootstrap UCL	19.36
Kolmogorov-Smirnov Test Statistic	0.208	95% Percentile Bootstrap UCL	18.1
Kolmogorov-Smirnov 5% Critical Value	0.336	95% BCA Bootstrap UCL	18.1
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	27.84
		97.5% Chebyshev(Mean, Sd) UCL	34.51
		99% Chebyshev(Mean, Sd) UCL	47.61
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	25.89		
95% Adjusted Gamma UCL (Use when n < 40)	34.74		
Potential UCL to Use		Use 95% Student's-t UCL	19.55
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

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IRON			
General Statistics			
Number of Valid Observations	6	Number of Distinct Observations	6
Number of Missing Values	1		
Raw Statistics		Log-transformed Statistics	
Minimum	7770	Minimum of Log Data	8.958
Maximum	37200	Maximum of Log Data	10.52
Mean	22662	Mean of log Data	9.899
Geometric Mean	19906	SD of log Data	0.59
Median	21800		
SD	11437		
Std. Error of Mean	4669		
Coefficient of Variation	0.505		
Skewness	0.035		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates! It is suggested to collect at least 8 to 10 observations using these statistical methods! If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.952	Shapiro Wilk Test Statistic	0.936
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	32070	95% H-UCL	50486
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	46993
95% Adjusted-CLT UCL (Chen-1995)	30413	97.5% Chebyshev (MVUE) UCL	57397
95% Modified-t UCL (Johnson-1978)	32082	99% Chebyshev (MVUE) UCL	77833
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.119	Data appear Normal at 5% Significance Level	
Theta Star	10695		
MLE of Mean	22662		
MLE of Standard Deviation	15568		
nu star	25.43		
Approximate Chi Square Value (.05)	14.94	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	30342
Adjusted Chi Square Value	12.14	95% Jackknife UCL	32070
		95% Standard Bootstrap UCL	29542
Anderson-Darling Test Statistic	0.254	95% Bootstrap-t UCL	33538
Anderson-Darling 5% Critical Value	0.7	95% Hall's Bootstrap UCL	29679
Kolmogorov-Smirnov Test Statistic	0.192	95% Percentile Bootstrap UCL	29633
Kolmogorov-Smirnov 5% Critical Value	0.334	95% BCA Bootstrap UCL	29517
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	43015
		97.5% Chebyshev(Mean, Sd) UCL	51821
		99% Chebyshev(Mean, Sd) UCL	69120
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	38571		
95% Adjusted Gamma UCL (Use when n < 40)	47479		
Potential UCL to Use		Use 95% Student's-t UCL	32070
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - FORMER BUILDING 234 UNPAVED SURFACE SOIL

LEAD			
General Statistics			
Number of Valid Observations	7	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	9.7	Minimum of Log Data	2.272
Maximum	189	Maximum of Log Data	5.242
Mean	53.94	Mean of log Data	3.477
Geometric Mean	32.36	SD of log Data	1.065
Median	23.4		
SD	63.68		
Std. Error of Mean	24.07		
Coefficient of Variation	1.18		
Skewness	2.016		
Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!			
It is suggested to collect at least 8 to 10 observations using these statistical methods!			
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
Warning: There are only 7 Values in this data			
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions			
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.731	Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.803
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	100.7	95% H-UCL	308.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	141.4
95% Adjusted-CLT UCL (Chen-1995)	113.1	97.5% Chebyshev (MVUE) UCL	180.4
95% Modified-t UCL (Johnson-1978)	103.8	99% Chebyshev (MVUE) UCL	257.1
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.733	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	73.61		
MLE of Mean	53.94		
MLE of Standard Deviation	63.01		
nu star	10.26		
Approximate Chi Square Value (.05)	4.105	Nonparametric Statistics	
Adjusted Level of Significance	0.0158	95% CLT UCL	93.53
Adjusted Chi Square Value	3.016	95% Jackknife UCL	100.7
		95% Standard Bootstrap UCL	90.43
Anderson-Darling Test Statistic	0.449	95% Bootstrap-t UCL	163
Anderson-Darling 5% Critical Value	0.726	95% Hall's Bootstrap UCL	223
Kolmogorov-Smirnov Test Statistic	0.241	95% Percentile Bootstrap UCL	96.23
Kolmogorov-Smirnov 5% Critical Value	0.319	95% BCA Bootstrap UCL	111.3
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	158.9
		97.5% Chebyshev(Mean, Sd) UCL	204.2
		99% Chebyshev(Mean, Sd) UCL	293.4
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	134.8		
95% Adjusted Gamma UCL (Use when n < 40)	183.5		
Potential UCL to Use		Use 95% Approximate Gamma UCL	134.8
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

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MANGANESE			
General Statistics			
Number of Valid Observations	6	Number of Distinct Observations	6
Number of Missing Values	1		
Raw Statistics		Log-transformed Statistics	
Minimum	157	Minimum of Log Data	5.056
Maximum	597	Maximum of Log Data	6.392
Mean	365.5	Mean of log Data	5.791
Geometric Mean	327.3	SD of log Data	0.535
Median	377.5		
SD	174.1		
Std. Error of Mean	71.09		
Coefficient of Variation	0.476		
Skewness	0.0359		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!			
It is suggested to collect at least 8 to 10 observations using these statistical methods!			
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
Warning: There are only 6 Values in this data			
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions			
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.941	Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	508.8	95% H-UCL	725.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	718.1
95% Adjusted-CLT UCL (Chen-1995)	483.5	97.5% Chebyshev (MVUE) UCL	869.6
95% Modified-t UCL (Johnson-1978)	508.9	99% Chebyshev (MVUE) UCL	1167
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.456	Data appear Normal at 5% Significance Level	
Theta Star	148.8		
MLE of Mean	365.5		
MLE of Standard Deviation	233.2		
nu star	29.47		
Approximate Chi Square Value (.05)	18.07	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	482.4
Adjusted Chi Square Value	14.95	95% Jackknife UCL	508.8
		95% Standard Bootstrap UCL	470.8
Anderson-Darling Test Statistic	0.305	95% Bootstrap-t UCL	517.8
Anderson-Darling 5% Critical Value	0.699	95% Hall's Bootstrap UCL	460.2
Kolmogorov-Smirnov Test Statistic	0.228	95% Percentile Bootstrap UCL	474
Kolmogorov-Smirnov 5% Critical Value	0.333	95% BCA Bootstrap UCL	474.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	675.4
		97.5% Chebyshev(Mean, Sd) UCL	809.5
		99% Chebyshev(Mean, Sd) UCL	1073
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	595.9		
95% Adjusted Gamma UCL (Use when n < 40)	720.6		
Potential UCL to Use			
		Use 95% Student's-t UCL	508.8
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

Former Building 234

Surface Soil

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

General UCL Statistics for Data Sets with Non-Detects		
User Selected Options		
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Surface Soil - Building 234.xls.w	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	
BENZO(A)ANTHRACENE		
General Statistics		
Number of Valid Data	8	
Number of Distinct Detected Data	6	
	Number of Detected Data	6
	Number of Non-Detect Data	2
	Percent Non-Detects	25.00%
Raw Statistics		
Minimum Detected	60	
Maximum Detected	470	
Mean of Detected	210	
SD of Detected	143.8	
Minimum Non-Detect	340	
Maximum Non-Detect	710	
Log-transformed Statistics		
Minimum Detected	4.094	
Maximum Detected	6.153	
Mean of Detected	5.151	
SD of Detected	0.705	
Minimum Non-Detect	5.829	
Maximum Non-Detect	6.565	
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		
Observations < Largest ND are treated as NDs		
Number treated as Non-Detect		8
Number treated as Detected		0
Single DL Non-Detect Percentage		100.00%
Warning: There are only 6 Detected Values in this data		
Note: It should be noted that even though bootstrap may be performed on this data set		
the resulting calculations may not be reliable enough to draw conclusions		
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.		
UCL Statistics		
Normal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.903	
5% Shapiro Wilk Critical Value	0.788	
Data appear Normal at 5% Significance Level		
Assuming Normal Distribution		
DL/2 Substitution Method		
Mean	223.1	
SD	133.4	
95% DL/2 (t) UCL	312.5	
Maximum Likelihood Estimate(MLE) Method	N/A	
MLE method failed to converge properly		

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

BENZO(A)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.46	Data appear Normal at 5% Significance Level	
Theta Star	143.8		
nu star	17.52		
A-D Test Statistic	0.177	Nonparametric Statistics	
5% A-D Critical Value	0.702	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.702	Mean	202.6
5% K-S Critical Value	0.335	SD	125.5
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	53.19
		95% KM (t) UCL	303.3
Assuming Gamma Distribution		95% KM (z) UCL	290.1
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	304.1
Minimum	60	95% KM (bootstrap t) UCL	356.8
Maximum	470	95% KM (BCA) UCL	291.7
Mean	206.2	95% KM (Percentile Bootstrap) UCL	288.8
Median	188.9	95% KM (Chebyshev) UCL	434.4
SD	122.1	97.5% KM (Chebyshev) UCL	534.7
k star	2.281	99% KM (Chebyshev) UCL	731.8
Theta star	90.39		
Nu star	36.49	Potential UCLs to Use	
AppChi2	23.66	95% KM (t) UCL	303.3
95% Gamma Approximate UCL (Use when n >= 40)	317.9	95% KM (Percentile Bootstrap) UCL	288.8
95% Adjusted Gamma UCL (Use when n < 40)	356.7		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

BENZO(A)PYRENE			
General Statistics			
Number of Valid Data	8	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	2
		Percent Non-Detects	25.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	50	Minimum Detected	3.912
Maximum Detected	410	Maximum Detected	6.016
Mean of Detected	190	Mean of Detected	5.052
SD of Detected	124.1	SD of Detected	0.719
Minimum Non-Detect	340	Minimum Non-Detect	5.829
Maximum Non-Detect	710	Maximum Non-Detect	6.565
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There are only 6 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.912	Shapiro Wilk Test Statistic	0.961
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	208.1	Mean	5.165
SD	120.7	SD	0.672
95% DL/2 (t) UCL	289	95% H-Stat (DL/2) UCL	433
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	5.022
		SD in Log Scale	0.611
		Mean in Original Scale	177.2
		SD in Original Scale	107.6
		95% t UCL	249.3
		95% Percentile Bootstrap UCL	237.4
		95% BCA Bootstrap UCL	252.4
		95% H-UCL	330.1

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

BENZO(A)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.473	Data appear Normal at 5% Significance Level	
Theta Star	129		
nu star	17.68		
A-D Test Statistic	0.238	Nonparametric Statistics	
5% A-D Critical Value	0.702	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.702	Mean	183.7
5% K-S Critical Value	0.335	SD	108.5
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	46.15
		95% KM (t) UCL	271.2
Assuming Gamma Distribution		95% KM (z) UCL	259.6
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	272
Minimum	50	95% KM (bootstrap t) UCL	288.6
Maximum	410	95% KM (BCA) UCL	252.5
Mean	186.7	95% KM (Percentile Bootstrap) UCL	260
Median	180.7	95% KM (Chebyshev) UCL	384.9
SD	105.3	97.5% KM (Chebyshev) UCL	471.9
k star	2.304	99% KM (Chebyshev) UCL	642.9
Theta star	81.04		
Nu star	36.87	Potential UCLs to Use	
AppChi2	23.97	95% KM (t) UCL	271.2
95% Gamma Approximate UCL (Use when n >= 40)	287.2	95% KM (Percentile Bootstrap) UCL	260
95% Adjusted Gamma UCL (Use when n < 40)	322.1		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

BENZO(B)FLUORANTHENE			
General Statistics			
Number of Valid Data	8	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	1
		Percent Non-Detects	12.50%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	56.5	Minimum Detected	4.034
Maximum Detected	660	Maximum Detected	6.492
Mean of Detected	271.8	Mean of Detected	5.277
SD of Detected	216.9	SD of Detected	0.93
Minimum Non-Detect	710	Minimum Non-Detect	6.565
Maximum Non-Detect	710	Maximum Non-Detect	6.565
Warning: There are only 7 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.916	Shapiro Wilk Test Statistic	0.941
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	282.2	Mean	5.352
SD	203	SD	0.887
95% DL/2 (t) UCL	418.1	95% H-Stat (DL/2) UCL	898.7
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	5.277
		SD in Log Scale	0.861
		Mean in Original Scale	262.3
		SD in Original Scale	202.6
		95% t UCL	398
		95% Percentile Bootstrap UCL	377.8
		95% BCA Bootstrap UCL	404.5
		95% H-UCL	776.6
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.051	Data appear Normal at 5% Significance Level	
Theta Star	258.6		
nu star	14.72		
A-D Test Statistic	0.226	Nonparametric Statistics	
5% A-D Critical Value	0.719	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.719	Mean	271.8
5% K-S Critical Value	0.316	SD	200.8
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	81.98
		95% KM (t) UCL	427.1
		95% KM (z) UCL	406.6
		95% KM (jackknife) UCL	428.7
		95% KM (bootstrap t) UCL	483.2
		95% KM (BCA) UCL	410.9
		95% KM (Percentile Bootstrap) UCL	398.3
		95% KM (Chebyshev) UCL	629.1
		97.5% KM (Chebyshev) UCL	783.8
		99% KM (Chebyshev) UCL	1087
Assuming Gamma Distribution		Potential UCLs to Use	
Gamma ROS Statistics using Extrapolated Data		95% KM (t) UCL	427.1
Minimum	56.5	95% KM (Percentile Bootstrap) UCL	398.3
Maximum	660		
Mean	271.7		
Median	250.4		
SD	200.8		
k star	1.267		
Theta star	214.5		
Nu star	20.27		
AppChi2	11.05		
95% Gamma Approximate UCL (Use when n >= 40)	498.4		
95% Adjusted Gamma UCL (Use when n < 40)	587.3		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

CHRYSENE			
General Statistics			
Number of Valid Data	8	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	1
		Percent Non-Detects	12.50%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	41	Minimum Detected	3.714
Maximum Detected	580	Maximum Detected	6.363
Mean of Detected	229.6	Mean of Detected	5.07
SD of Detected	189	SD of Detected	1.003
Minimum Non-Detect	710	Minimum Non-Detect	6.565
Maximum Non-Detect	710	Maximum Non-Detect	6.565
Warning: There are only 7 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.903	Shapiro Wilk Test Statistic	0.917
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	245.3	Mean	5.171
SD	180.5	SD	0.971
95% DL/2 (t) UCL	366.1	95% H-Stat (DL/2) UCL	967
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	5.07
		SD in Log Scale	0.929
		Mean in Original Scale	220.8
		SD in Original Scale	176.7
		95% t UCL	339.2
		95% Percentile Bootstrap UCL	328.8
		95% BCA Bootstrap UCL	346.3
		95% H-UCL	768.4
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.959	Data appear Normal at 5% Significance Level	
Theta Star	239.3		
nu star	13.43		
A-D Test Statistic	0.284	Nonparametric Statistics	
5% A-D Critical Value	0.721	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.721	Mean	229.6
5% K-S Critical Value	0.317	SD	175
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	71.43
		95% KM (t) UCL	364.9
Assuming Gamma Distribution		95% KM (z) UCL	347.1
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	366.3
Minimum	41	95% KM (bootstrap t) UCL	426.1
Maximum	580	95% KM (BCA) UCL	351.4
Mean	229	95% KM (Percentile Bootstrap) UCL	347.3
Median	222.5	95% KM (Chebyshev) UCL	540.9
SD	175	97.5% KM (Chebyshev) UCL	675.6
k star	1.152	99% KM (Chebyshev) UCL	940.3
Theta star	198.8		
Nu star	18.43	Potential UCLs to Use	
AppChi2	9.702	95% KM (t) UCL	364.9
95% Gamma Approximate UCL (Use when n >= 40)	435	95% KM (Percentile Bootstrap) UCL	347.3
95% Adjusted Gamma UCL (Use when n < 40)	517.8		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

DIBENZO(A,H)ANTHRACENE			
General Statistics			
Number of Valid Data	7	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	6
Number of Missing Values	1	Percent Non-Detects	85.71%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable DIBENZO(A,H)ANTHRACENE was not processed!			

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

INDENO(1,2,3-CD)PYRENE			
General Statistics			
Number of Valid Data	8	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	4
		Percent Non-Detects	50.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	48	Minimum Detected	3.871
Maximum Detected	190	Maximum Detected	5.247
Mean of Detected	117	Mean of Detected	4.628
SD of Detected	64.67	SD of Detected	0.623
Minimum Non-Detect	340	Minimum Non-Detect	5.829
Maximum Non-Detect	1700	Maximum Non-Detect	7.438
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There are only 4 Distinct Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.952	Shapiro Wilk Test Statistic	0.95
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	252.3	Mean	5.179
SD	258.1	SD	0.871
95% DL/2 (t) UCL	425.1	95% H-Stat (DL/2) UCL	723.6
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	4.628
		SD in Log Scale	0.408
		Mean in Original Scale	109.6
		SD in Original Scale	43.06
		95% t UCL	138.5
		95% Percentile Bootstrap UCL	133.5
		95% BCA Bootstrap UCL	136.5
		95% H-UCL	156.1

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

INDENO(1,2,3-CD)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.136	Data appear Normal at 5% Significance Level	
Theta Star	103		
nu star	9.089		
A-D Test Statistic	0.273	Nonparametric Statistics	
5% A-D Critical Value	0.659	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.659	Mean	117
5% K-S Critical Value	0.396	SD	56.01
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	32.34
		95% KM (t) UCL	178.3
Assuming Gamma Distribution		95% KM (z) UCL	170.2
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	183.2
Minimum	48	95% KM (bootstrap t) UCL	185.9
Maximum	190	95% KM (BCA) UCL	170
Mean	117.3	95% KM (Percentile Bootstrap) UCL	170
Median	117.5	95% KM (Chebyshev) UCL	258
SD	42.34	97.5% KM (Chebyshev) UCL	318.9
k star	4.833	99% KM (Chebyshev) UCL	438.7
Theta star	24.26		
Nu star	77.33	Potential UCLs to Use	
AppChi2	58.08	95% KM (t) UCL	178.3
95% Gamma Approximate UCL (Use when n >= 40)	156.2	95% KM (Percentile Bootstrap) UCL	170
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

ALUMINUM					
General Statistics					
Number of Valid Observations		7	Number of Distinct Observations		7
Number of Missing Values		1			
Raw Statistics			Log-transformed Statistics		
Minimum		3810	Minimum of Log Data		8.245
Maximum		11300	Maximum of Log Data		9.333
Mean		7361	Mean of log Data		8.829
Geometric Mean		6826	SD of log Data		0.424
Median		6125			
SD		3012			
Std. Error of Mean		1139			
Coefficient of Variation		0.409			
Skewness		0.254			
Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 7 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.874	Shapiro Wilk Test Statistic		0.899
Shapiro Wilk Critical Value		0.803	Shapiro Wilk Critical Value		0.803
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		9573	95% H-UCL		11151
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		12535
95% Adjusted-CLT UCL (Chen-1995)		9350	97.5% Chebyshev (MVUE) UCL		14771
95% Modified-t UCL (Johnson-1978)		9591	99% Chebyshev (MVUE) UCL		19163
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		3.978	Data appear Normal at 5% Significance Level		
Theta Star		1850			
MLE of Mean		7361			
MLE of Standard Deviation		3690			
nu star		55.69			
Approximate Chi Square Value (.05)		39.54	Nonparametric Statistics		
Adjusted Level of Significance		0.0158	95% CLT UCL		9233
Adjusted Chi Square Value		35.47	95% Jackknife UCL		9573
			95% Standard Bootstrap UCL		9060
Anderson-Darling Test Statistic		0.476	95% Bootstrap-t UCL		9783
Anderson-Darling 5% Critical Value		0.709	95% Hall's Bootstrap UCL		8660
Kolmogorov-Smirnov Test Statistic		0.262	95% Percentile Bootstrap UCL		9108
Kolmogorov-Smirnov 5% Critical Value		0.313	95% BCA Bootstrap UCL		9136
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		12323
			97.5% Chebyshev(Mean, Sd) UCL		14471
			99% Chebyshev(Mean, Sd) UCL		18689
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		10367			
95% Adjusted Gamma UCL (Use when n < 40)		11556			
Potential UCL to Use			Use 95% Student's-t UCL		9573
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

BERYLLIUM			
General Statistics			
Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
Number of Missing Values	1	Percent Non-Detects	14.29%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.18	Minimum Detected	-1.715
Maximum Detected	3.5	Maximum Detected	1.253
Mean of Detected	0.863	Mean of Detected	-0.771
SD of Detected	1.299	SD of Detected	1.072
Minimum Non-Detect	0.2	Minimum Non-Detect	-1.609
Maximum Non-Detect	0.2	Maximum Non-Detect	-1.609
Warning: There are only 6 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.593	Shapiro Wilk Test Statistic	0.835
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.754	Mean	-0.99
SD	1.22	SD	1.137
95% DL/2 (t) UCL	1.65	95% H-Stat (DL/2) UCL	4.74
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.476	Mean in Log Scale	-0.981
SD	1.412	SD in Log Scale	1.125
95% MLE (t) UCL	1.513	Mean in Original Scale	0.755
95% MLE (Tiku) UCL	1.545	SD in Original Scale	1.22
		95% t UCL	1.65
		95% Percentile Bootstrap UCL	1.641
		95% BCA Bootstrap UCL	2.073
		95% H UCL	4.544

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

BERYLLIUM (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.578	Data appear Lognormal at 5% Significance Level	
Theta Star	1.493		
nu star	6.934		
A-D Test Statistic	0.831	Nonparametric Statistics	
5% A-D Critical Value	0.717	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.717	Mean	0.765
5% K-S Critical Value	0.342	SD	1.124
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.465
		95% KM (t) UCL	1.669
Assuming Gamma Distribution		95% KM (z) UCL	1.53
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.653
Minimum	0.000001	95% KM (bootstrap t) UCL	7.397
Maximum	3.5	95% KM (BCA) UCL	1.676
Mean	0.739	95% KM (Percentile Bootstrap) UCL	1.646
Median	0.29	95% KM (Chebyshev) UCL	2.793
SD	1.23	97.5% KM (Chebyshev) UCL	3.67
k star	0.264	99% KM (Chebyshev) UCL	5.394
Theta star	2.795		
Nu star	3.703	Potential UCLs to Use	
AppChi2	0.608	97.5% KM (Chebyshev) UCL	3.67
95% Gamma Approximate UCL (Use when n >= 40)	4.503		
95% Adjusted Gamma UCL (Use when n < 40)	8.355		
Warning: Recommended UCL exceeds the maximum observation			
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

CADMIUM			
General Statistics			
Number of Valid Data	8	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	7
		Percent Non-Detects	87.50%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable CADMIUM was not processed!			

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Surface Soil - Building 234.xls.w
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
ALUMINUM	
General Statistics	
Number of Valid Observations	7
Number of Missing Values	1
Number of Distinct Observations	7
Raw Statistics	
Minimum	3810
Maximum	11300
Mean	7361
Geometric Mean	6826
Median	6125
SD	3012
Std. Error of Mean	1139
Coefficient of Variation	0.409
Skewness	0.254
Log-transformed Statistics	
Minimum of Log Data	8.245
Maximum of Log Data	9.333
Mean of log Data	8.829
SD of log Data	0.424
Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!	
It is suggested to collect at least 8 to 10 observations using these statistical methods!	
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.	
Warning: There are only 7 Values in this data	
Note: It should be noted that even though bootstrap methods may be performed on this data set,	
the resulting calculations may not be reliable enough to draw conclusions	
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.	
Relevant UCL Statistics	
Normal Distribution Test	
Shapiro Wilk Test Statistic	0.874
Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level	
Assuming Normal Distribution	
95% Student's-t UCL	9573
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	9350
95% Modified-t UCL (Johnson-1978)	9591
Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.899
Shapiro Wilk Critical Value	0.803
Data appear Lognormal at 5% Significance Level	
Assuming Lognormal Distribution	
95% H-UCL	11151
95% Chebyshev (MVUE) UCL	12535
97.5% Chebyshev (MVUE) UCL	14771
99% Chebyshev (MVUE) UCL	19163

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

ALUMINUM (Continued)			
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	3.978	Data appear Normal at 5% Significance Level	
Theta Star	1850		
MLE of Mean	7361		
MLE of Standard Deviation	3690		
nu star	55.69		
Approximate Chi Square Value (.05)	39.54	Nonparametric Statistics	
Adjusted Level of Significance	0.0158	95% CLT UCL	9233
Adjusted Chi Square Value	35.47	95% Jackknife UCL	9573
		95% Standard Bootstrap UCL	9097
Anderson-Darling Test Statistic	0.476	95% Bootstrap-t UCL	9756
Anderson-Darling 5% Critical Value	0.709	95% Hall's Bootstrap UCL	8676
Kolmogorov-Smirnov Test Statistic	0.262	95% Percentile Bootstrap UCL	9121
Kolmogorov-Smirnov 5% Critical Value	0.313	95% BCA Bootstrap UCL	9294
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12323
		97.5% Chebyshev(Mean, Sd) UCL	14471
		99% Chebyshev(Mean, Sd) UCL	18689
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	10367		
95% Adjusted Gamma UCL (Use when n < 40)	11556		
Potential UCL to Use		Use 95% Student's-t UCL 9573	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

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ARSENIC					
General Statistics					
Number of Valid Observations		8	Number of Distinct Observations		8
Raw Statistics			Log-transformed Statistics		
Minimum		2.6	Minimum of Log Data		0.956
Maximum		23.6	Maximum of Log Data		3.161
Mean		11.19	Mean of log Data		2.155
Geometric Mean		8.63	SD of log Data		0.811
Median		9.575			
SD		7.835			
Std. Error of Mean		2.77			
Coefficient of Variation		0.7			
Skewness		0.464			
Warning: There are only 8 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.909	Shapiro Wilk Test Statistic		0.931
Shapiro Wilk Critical Value		0.818	Shapiro Wilk Critical Value		0.818
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		16.44	95% H-UCL		29.89
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		25.95
95% Adjusted-CLT UCL (Chen-1995)		16.24	97.5% Chebyshev (MVUE) UCL		32.24
95% Modified-t UCL (Johnson-1978)		16.52	99% Chebyshev (MVUE) UCL		44.59
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		1.379	Data appear Normal at 5% Significance Level		
Theta Star		8.116			
MLE of Mean		11.19			
MLE of Standard Deviation		9.532			
nu star		22.07			
Approximate Chi Square Value (.05)		12.39	Nonparametric Statistics		
Adjusted Level of Significance		0.0195	95% CLT UCL		15.75
Adjusted Chi Square Value		10.6	95% Jackknife UCL		16.44
			95% Standard Bootstrap UCL		15.45
Anderson-Darling Test Statistic		0.338	95% Bootstrap-t UCL		17.91
Anderson-Darling 5% Critical Value		0.724	95% Hall's Bootstrap UCL		15.22
Kolmogorov-Smirnov Test Statistic		0.206	95% Percentile Bootstrap UCL		15.64
Kolmogorov-Smirnov 5% Critical Value		0.297	95% BCA Bootstrap UCL		15.84
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		23.27
			97.5% Chebyshev(Mean, Sd) UCL		28.49
Assuming Gamma Distribution			99% Chebyshev(Mean, Sd) UCL		38.76
95% Approximate Gamma UCL (Use when n >= 40)		19.94			
95% Adjusted Gamma UCL (Use when n < 40)		23.3			
Potential UCL to Use			Use 95% Student's-t UCL		
			16.44		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

CADMIUM			
General Statistics			
Number of Valid Observations		8	Number of Distinct Observations
			7
Raw Statistics		Log-transformed Statistics	
Minimum		0.47	Minimum of Log Data
Maximum		13	Maximum of Log Data
Mean		2.105	Mean of log Data
Geometric Mean		0.813	SD of log Data
Median		0.56	
SD		4.402	
Std. Error of Mean		1.556	
Coefficient of Variation		2.091	
Skewness		2.828	
Warning: There are only 8 Values in this data			
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions			
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic		0.427	Shapiro Wilk Test Statistic
Shapiro Wilk Critical Value		0.818	Shapiro Wilk Critical Value
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL		5.054	95% H-UCL
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL
95% Adjusted-CLT UCL (Chen-1995)		6.328	97.5% Chebyshev (MVUE) UCL
95% Modified-t UCL (Johnson-1978)		5.313	99% Chebyshev (MVUE) UCL
Gamma Distribution Test		Data Distribution	
k star (bias corrected)		0.485	Data do not follow a Discernable Distribution (0.05)
Theta Star		4.339	
MLE of Mean		2.105	
MLE of Standard Deviation		3.022	
nu star		7.762	
Approximate Chi Square Value (.05)		2.598	Nonparametric Statistics
Adjusted Level of Significance		0.0195	95% CLT UCL
Adjusted Chi Square Value		1.906	95% Jackknife UCL
Anderson-Darling Test Statistic		2.36	95% Standard Bootstrap UCL
Anderson-Darling 5% Critical Value		0.753	95% Bootstrap-t UCL
Kolmogorov-Smirnov Test Statistic		0.523	95% Hall's Bootstrap UCL
Kolmogorov-Smirnov 5% Critical Value		0.306	95% Percentile Bootstrap UCL
Data not Gamma Distributed at 5% Significance Level			95% BCA Bootstrap UCL
Assuming Gamma Distribution			95% Chebyshev(Mean, Sd) UCL
95% Approximate Gamma UCL (Use when n >= 40)		6.289	97.5% Chebyshev(Mean, Sd) UCL
95% Adjusted Gamma UCL (Use when n < 40)		8.571	99% Chebyshev(Mean, Sd) UCL
Potential UCL to Use			Use 95% Hall's Bootstrap UCL
			157
Recommended UCL exceeds the maximum observation			
In Case Bootstrap t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (Mean, Sd) UCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

COBALT					
General Statistics					
Number of Valid Observations		7	Number of Distinct Observations		7
Number of Missing Values		1			
Raw Statistics			Log-transformed Statistics		
Minimum		3.3	Minimum of Log Data		1.194
Maximum		23.9	Maximum of Log Data		3.174
Mean		11.82	Mean of log Data		2.254
Geometric Mean		9.524	SD of log Data		0.729
Median		8.25			
SD		8.065			
Std. Error of Mean		3.048			
Coefficient of Variation		0.682			
Skewness		0.714			
Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 7 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.886	Shapiro Wilk Test Statistic		0.955
Shapiro Wilk Critical Value		0.803	Shapiro Wilk Critical Value		0.803
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		17.75	95% H-UCL		30.07
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		26.24
95% Adjusted-CLT UCL (Chen-1995)		17.71	97.5% Chebyshev (MVUE) UCL		32.46
95% Modified-t UCL (Johnson-1978)		17.88	99% Chebyshev (MVUE) UCL		44.66
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		1.505	Data appear Normal at 5% Significance Level		
Theta Star		7.855			
MLE of Mean		11.82			
MLE of Standard Deviation		9.636			
nu star		21.07			
Approximate Chi Square Value (.05)		11.64	Nonparametric Statistics		
Adjusted Level of Significance		0.0158	95% CLT UCL		16.84
Adjusted Chi Square Value		9.6	95% Jackknife UCL		17.75
			95% Standard Bootstrap UCL		16.43
Anderson-Darling Test Statistic		0.28	95% Bootstrap-t UCL		22.74
Anderson-Darling 5% Critical Value		0.714	95% Hall's Bootstrap UCL		19.71
Kolmogorov-Smirnov Test Statistic		0.195	95% Percentile Bootstrap UCL		16.64
Kolmogorov-Smirnov 5% Critical Value		0.314	95% BCA Bootstrap UCL		17.24
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		25.11
			97.5% Chebyshev(Mean, Sd) UCL		30.86
			99% Chebyshev(Mean, Sd) UCL		42.15
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		21.39			
95% Adjusted Gamma UCL (Use when n < 40)		25.95			
Potential UCL to Use			Use 95% Student's-t UCL		17.75
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

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IRON					
General Statistics					
Number of Valid Observations		7	Number of Distinct Observations		7
Number of Missing Values		1			
Raw Statistics			Log-transformed Statistics		
Minimum		7770	Minimum of Log Data		8.958
Maximum		37200	Maximum of Log Data		10.52
Mean		22324	Mean of log Data		9.902
Geometric Mean		19962	SD of log Data		0.539
Median		20300			
SD		10479			
Std. Error of Mean		3961			
Coefficient of Variation		0.469			
Skewness		0.168			
Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 7 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.971	Shapiro Wilk Test Statistic		0.953
Shapiro Wilk Critical Value		0.803	Shapiro Wilk Critical Value		0.803
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		30021	95% H-UCL		40383
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		42705
95% Adjusted-CLT UCL (Chen-1995)		29108	97.5% Chebyshev (MVUE) UCL		51420
95% Modified-t UCL (Johnson-1978)		30062	99% Chebyshev (MVUE) UCL		68538
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		2.741	Data appear Normal at 5% Significance Level		
Theta Star		8144			
MLE of Mean		22324			
MLE of Standard Deviation		13483			
nu star		38.38			
Approximate Chi Square Value (.05)		25.19	Nonparametric Statistics		
Adjusted Level of Significance		0.0158	95% CLT UCL		28839
Adjusted Chi Square Value		22.02	95% Jackknife UCL		30021
			95% Standard Bootstrap UCL		28342
Anderson-Darling Test Statistic		0.186	95% Bootstrap-t UCL		30925
Anderson-Darling 5% Critical Value		0.71	95% Hall's Bootstrap UCL		29319
Kolmogorov-Smirnov Test Statistic		0.138	95% Percentile Bootstrap UCL		28371
Kolmogorov-Smirnov 5% Critical Value		0.313	95% BCA Bootstrap UCL		28767
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		39588
			97.5% Chebyshev(Mean, Sd) UCL		47059
			99% Chebyshev(Mean, Sd) UCL		61732
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		34011			
95% Adjusted Gamma UCL (Use when n < 40)		38909			
Potential UCL to Use			Use 95% Student's-t UCL		30021
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

LEAD			
General Statistics			
Number of Valid Observations		8	Number of Distinct Observations
			8
Raw Statistics		Log-transformed Statistics	
Minimum		9.7	Minimum of Log Data
Maximum		189	Maximum of Log Data
Mean		53.64	Mean of log Data
Geometric Mean		34.3	SD of log Data
Median		37.45	1
SD		58.96	
Std. Error of Mean		20.85	
Coefficient of Variation		1.099	
Skewness		2.094	
Warning: There are only 8 Values in this data			
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions			
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic		0.736	Shapiro Wilk Test Statistic
Shapiro Wilk Critical Value		0.818	Shapiro Wilk Critical Value
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL		93.13	95% H-UCL
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL
95% Adjusted-CLT UCL (Chen-1995)		104.4	97.5% Chebyshev (MVUE) UCL
95% Modified-t UCL (Johnson-1978)		95.7	99% Chebyshev (MVUE) UCL
Gamma Distribution Test		Data Distribution	
k star (bias corrected)		0.87	Data appear Gamma Distributed at 5% Significance Level
Theta Star		61.65	
MLE of Mean		53.64	
MLE of Standard Deviation		57.5	
nu star		13.92	
Approximate Chi Square Value (.05)		6.517	Nonparametric Statistics
Adjusted Level of Significance		0.0195	95% CLT UCL
Adjusted Chi Square Value		5.291	95% Jackknife UCL
Anderson-Darling Test Statistic		0.394	95% Standard Bootstrap UCL
Anderson-Darling 5% Critical Value		0.732	95% Bootstrap-t UCL
Kolmogorov-Smirnov Test Statistic		0.192	95% Hall's Bootstrap UCL
Kolmogorov-Smirnov 5% Critical Value		0.3	95% Percentile Bootstrap UCL
Data appear Gamma Distributed at 5% Significance Level			95% BCA Bootstrap UCL
Assuming Gamma Distribution			95% Chebyshev(Mean, Sd) UCL
95% Approximate Gamma UCL (Use when n >= 40)		114.6	97.5% Chebyshev(Mean, Sd) UCL
95% Adjusted Gamma UCL (Use when n < 40)		141.1	99% Chebyshev(Mean, Sd) UCL
Potential UCL to Use			
			Use 95% Approximate Gamma UCL
			114.6
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - BUILDING 234 SURFACE SOIL

MANGANESE					
General Statistics					
Number of Valid Observations		7	Number of Distinct Observations		7
Number of Missing Values		1			
Raw Statistics			Log-transformed Statistics		
Minimum		157	Minimum of Log Data		5.056
Maximum		597	Maximum of Log Data		6.392
Mean		356.2	Mean of log Data		5.779
Geometric Mean		323.3	SD of log Data		0.49
Median		307			
SD		160.9			
Std. Error of Mean		60.8			
Coefficient of Variation		0.452			
Skewness		0.263			
Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 7 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.95	Shapiro Wilk Test Statistic		0.946
Shapiro Wilk Critical Value		0.803	Shapiro Wilk Critical Value		0.803
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		474.4	95% H-UCL		593.9
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		648
95% Adjusted-CLT UCL (Chen-1995)		462.7	97.5% Chebyshev (MVUE) UCL		773.5
95% Modified-t UCL (Johnson-1978)		475.4	99% Chebyshev (MVUE) UCL		1020
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		3.137	Data appear Normal at 5% Significance Level		
Theta Star		113.6			
MLE of Mean		356.2			
MLE of Standard Deviation		201.1			
nu star		43.91			
Approximate Chi Square Value (.05)		29.72	Nonparametric Statistics		
Adjusted Level of Significance		0.0158	95% CLT UCL		456.2
Adjusted Chi Square Value		26.24	95% Jackknife UCL		474.4
			95% Standard Bootstrap UCL		449
Anderson-Darling Test Statistic		0.255	95% Bootstrap-t UCL		489.3
Anderson-Darling 5% Critical Value		0.71	95% Hall's Bootstrap UCL		447.5
Kolmogorov-Smirnov Test Statistic		0.184	95% Percentile Bootstrap UCL		446
Kolmogorov-Smirnov 5% Critical Value		0.313	95% BCA Bootstrap UCL		455.1
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		621.2
			97.5% Chebyshev(Mean, Sd) UCL		735.9
			99% Chebyshev(Mean, Sd) UCL		961.1
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		526.4			
95% Adjusted Gamma UCL (Use when n < 40)		596.1			
Potential UCL to Use			Use 95% Student's-t UCL		474.4
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

Former Building 234

Subsurface Soil

PROUCL OUTPUT - FORMER BUILDING 234 SUBSURFACE SOIL

General UCL Statistics for Data Sets with Non-Detects	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - Building 234.x
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
BENZO(A)PYRENE	
General Statistics	
Number of Valid Data	10
Number of Distinct Detected Data	2
Number of Missing Values	4
Number of Detected Data	2
Number of Non-Detect Data	8
Percent Non-Detects	80.00%
Raw Statistics	Log-transformed Statistics
Minimum Detected	41.5
Maximum Detected	55
Mean of Detected	48.25
SD of Detected	9.546
Minimum Non-Detect	340
Maximum Non-Detect	3900
Minimum Detected	3.726
Maximum Detected	4.007
Mean of Detected	3.867
SD of Detected	0.199
Minimum Non-Detect	5.829
Maximum Non-Detect	8.269
Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage
Warning: Data set has only 2 Distinct Detected Values.	
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.	
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).	
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.	
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.	
Those methods will return a 'N/A' value on your output display!	
It is necessary to have 4 or more Distinct Values for bootstrap methods.	
However, results obtained using 4 to 9 distinct values may not be reliable.	
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.	
UCL Statistics	
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	Shapiro Wilk Test Statistic
5% Shapiro Wilk Critical Value	5% Shapiro Wilk Critical Value
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level
Assuming Normal Distribution	Assuming Lognormal Distribution
DL/2 Substitution Method	DL/2 Substitution Method
Mean	Mean
SD	SD
95% DL/2 (t) UCL	95% H-Stat (DL/2) UCL
Maximum Likelihood Estimate(MLE) Method	Log ROS Method
MLE method failed to converge properly	Mean in Log Scale
	SD in Log Scale
	Mean in Original Scale
	SD in Original Scale
	95% t UCL
	95% Percentile Bootstrap UCL
	95% BCA Bootstrap UCL
	95% H-UCL

PROUCL OUTPUT - FORMER BUILDING 234 SUBSURFACE SOIL

BENZO(A)PYRENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	48.25
5% K-S Critical Value	N/A	SD	6.75
Data not Gamma Distributed at 5% Significance Level		SE of Mean	6.75
		95% KM (t) UCL	60.62
Assuming Gamma Distribution		95% KM (z) UCL	59.35
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	64.85
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	55
Mean	N/A	95% KM (Percentile Bootstrap) UCL	55
Median	N/A	95% KM (Chebyshev) UCL	77.67
SD	N/A	97.5% KM (Chebyshev) UCL	90.4
k star	N/A	99% KM (Chebyshev) UCL	115.4
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	60.62
95% Gamma Approximate UCL (Use when n >= 40)	N/A	95% KM (% Bootstrap) UCL	55
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Warning: Recommended UCL exceeds the maximum observation			
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - FORMER BUILDING 234 SUBSURFACE SOIL

ARSENIC			
General Statistics			
Number of Valid Data	16	Number of Detected Data	15
Number of Distinct Detected Data	15	Number of Non-Detect Data	1
		Percent Non-Detects	6.25%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.2	Minimum Detected	0.182
Maximum Detected	42	Maximum Detected	3.738
Mean of Detected	12.77	Mean of Detected	2.221
SD of Detected	10.2	SD of Detected	0.916
Minimum Non-Detect	3.5	Minimum Non-Detect	1.253
Maximum Non-Detect	3.5	Maximum Non-Detect	1.253
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.85	Shapiro Wilk Test Statistic	0.95
5% Shapiro Wilk Critical Value	0.881	5% Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	12.08	Mean	2.118
SD	10.23	SD	0.977
95% DL/2 (t) UCL	16.56	95% H-Stat (DL/2) UCL	26.28
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	10.51	Mean in Log Scale	2.143
SD	12.05	SD in Log Scale	0.938
95% MLE (t) UCL	15.8	Mean in Original Scale	12.13
95% MLE (Tiku) UCL	15.99	SD in Original Scale	10.18
		95% t UCL	16.59
		95% Percentile Bootstrap UCL	16.37
		95% BCA Bootstrap UCL	17.35
		95% H UCL	24.93
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.391	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	9.175		
nu star	41.74		
A-D Test Statistic	0.254	Nonparametric Statistics	
5% A-D Critical Value	0.751	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.751	Mean	12.12
5% K-S Critical Value	0.225	SD	9.866
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	2.554
Assuming Gamma Distribution		95% KM (t) UCL	16.6
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	16.32
Minimum	0.000001	95% KM (jackknife) UCL	16.59
Maximum	42	95% KM (bootstrap t) UCL	18.53
Mean	11.97	95% KM (BCA) UCL	16.06
Median	9.75	95% KM (Percentile Bootstrap) UCL	16.47
SD	10.36	95% KM (Chebyshev) UCL	23.26
k star	0.45	97.5% KM (Chebyshev) UCL	28.07
Theta star	26.6	99% KM (Chebyshev) UCL	37.54
Nu star	14.4	Potential UCLs to Use	
AppChi2	6.844	95% KM (Chebyshev) UCL	23.26
95% Gamma Approximate UCL (Use when n >= 40)	25.18		
95% Adjusted Gamma UCL (Use when n < 40)	27.53		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - FORMER BUILDING 234 SUBSURFACE SOIL

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - Building 234.x
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
ALUMINUM	
General Statistics	
Number of Valid Observations	16
Number of Distinct Observations	16
Raw Statistics	
Minimum	1690
Maximum	23300
Mean	9988
Geometric Mean	8124
Median	10050
SD	5995
Std. Error of Mean	1499
Coefficient of Variation	0.6
Skewness	0.629
Log-transformed Statistics	
Minimum of Log Data	7.432
Maximum of Log Data	10.06
Mean of log Data	9.003
SD of log Data	0.718
Relevant UCL Statistics	
Normal Distribution Test	
Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical Value	0.887
Data appear Normal at 5% Significance Level	
Assuming Normal Distribution	
95% Student's-t UCL	12615
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	12705
95% Modified-t UCL (Johnson-1978)	12654
Gamma Distribution Test	
k star (bias corrected)	2.135
Theta Star	4679
MLE of Mean	9988
MLE of Standard Deviation	6836
nu star	68.31
Approximate Chi Square Value (.05)	50.29
Adjusted Level of Significance	0.0335
Adjusted Chi Square Value	48.53
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
95% Approximate Gamma UCL (Use when n >= 40)	13567
95% Adjusted Gamma UCL (Use when n < 40)	14059
Potential UCL to Use	
Use 95% Student's-t UCL	12615
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.	

PROUCL OUTPUT - FORMER BUILDING 234 SUBSURFACE SOIL

CHROMIUM					
General Statistics					
Number of Valid Observations		16	Number of Distinct Observations		16
Raw Statistics			Log-transformed Statistics		
Minimum		2.2	Minimum of Log Data		0.788
Maximum		60.2	Maximum of Log Data		4.098
Mean		18.47	Mean of log Data		2.692
Geometric Mean		14.77	SD of log Data		0.738
Median		16.3			
SD		13.31			
Std. Error of Mean		3.328			
Coefficient of Variation		0.721			
Skewness		2.169			
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.796	Shapiro Wilk Test Statistic		0.932
Shapiro Wilk Critical Value		0.887	Shapiro Wilk Critical Value		0.887
Data not Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		24.31	95% H-UCL		30.22
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		
95% Adjusted-CLT UCL (Chen-1995)		25.87	97.5% Chebyshev (MVUE) UCL		42.24
95% Modified-t UCL (Johnson-1978)		24.61	99% Chebyshev (MVUE) UCL		56.04
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		1.981	Data appear Gamma Distributed at 5% Significance Level		
Theta Star		9.325			
MLE of Mean		18.47			
MLE of Standard Deviation		13.12			
nu star		63.39			
Approximate Chi Square Value (.05)		46.07	Nonparametric Statistics		
Adjusted Level of Significance		0.0335	95% CLT UCL		23.95
Adjusted Chi Square Value		44.39	95% Jackknife UCL		24.31
			95% Standard Bootstrap UCL		23.86
Anderson-Darling Test Statistic		0.397	95% Bootstrap-t UCL		28.06
Anderson-Darling 5% Critical Value		0.748	95% Hall's Bootstrap UCL		53.4
Kolmogorov-Smirnov Test Statistic		0.173	95% Percentile Bootstrap UCL		23.82
Kolmogorov-Smirnov 5% Critical Value		0.217	95% BCA Bootstrap UCL		26.05
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		32.98
			97.5% Chebyshev(Mean, Sd) UCL		39.25
			99% Chebyshev(Mean, Sd) UCL		51.58
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		25.41			
95% Adjusted Gamma UCL (Use when n < 40)		26.37			
Potential UCL to Use			Use 95% Approximate Gamma UCL		
			25.41		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)					
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

PROUCL OUTPUT - FORMER BUILDING 234 SUBSURFACE SOIL

COBALT			
General Statistics			
Number of Valid Observations	16	Number of Distinct Observations	15
Raw Statistics		Log-transformed Statistics	
Minimum	1.1	Minimum of Log Data	0.0953
Maximum	25	Maximum of Log Data	3.219
Mean	10.65	Mean of log Data	2.146
Geometric Mean	8.547	SD of log Data	0.79
Median	11.4		
SD	6.043		
Std. Error of Mean	1.511		
Coefficient of Variation	0.567		
Skewness	0.473		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.948	Shapiro Wilk Test Statistic	0.875
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	13.3	95% H-UCL	19.04
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	21.89
95% Adjusted-CLT UCL (Chen-1995)	13.33	97.5% Chebyshev (MVUE) UCL	26.43
95% Modified-t UCL (Johnson-1978)	13.33	99% Chebyshev (MVUE) UCL	35.35
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.013	Data appear Normal at 5% Significance Level	
Theta Star	5.29		
MLE of Mean	10.65		
MLE of Standard Deviation	7.506		
nu star	64.42		
Approximate Chi Square Value (.05)	46.96	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	13.13
Adjusted Chi Square Value	45.26	95% Jackknife UCL	13.3
		95% Standard Bootstrap UCL	13.05
Anderson-Darling Test Statistic	0.603	95% Bootstrap-t UCL	13.52
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	13.83
Kolmogorov-Smirnov Test Statistic	0.229	95% Percentile Bootstrap UCL	13.04
Kolmogorov-Smirnov 5% Critical Value	0.217	95% BCA Bootstrap UCL	13.24
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	17.23
		97.5% Chebyshev(Mean, Sd) UCL	20.08
		99% Chebyshev(Mean, Sd) UCL	25.68
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	14.61		
95% Adjusted Gamma UCL (Use when n < 40)	15.16		
Potential UCL to Use		Use 95% Student's-t UCL	13.3
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - FORMER BUILDING 234 SUBSURFACE SOIL

COPPER						
General Statistics						
Number of Valid Observations		16	Number of Distinct Observations		16	
Raw Statistics			Log-transformed Statistics			
Minimum		4.1	Minimum of Log Data		1.411	
Maximum		46.1	Maximum of Log Data		3.831	
Mean		25.53	Mean of log Data		3.058	
Geometric Mean		21.29	SD of log Data		0.706	
Median		23				
SD		12.98				
Std. Error of Mean		3.245				
Coefficient of Variation		0.508				
Skewness		-0.124				
Relevant UCL Statistics						
Normal Distribution Test			Lognormal Distribution Test			
Shapiro Wilk Test Statistic		0.955	Shapiro Wilk Test Statistic		0.872	
Shapiro Wilk Critical Value		0.887	Shapiro Wilk Critical Value		0.887	
Data appear Normal at 5% Significance Level			Data not Lognormal at 5% Significance Level			
Assuming Normal Distribution			Assuming Lognormal Distribution			
95% Student's-t UCL		31.22	95% H-UCL		41.46	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL			48.64
95% Adjusted-CLT UCL (Chen-1995)		30.76	97.5% Chebyshev (MVUE) UCL			58.08
95% Modified-t UCL (Johnson-1978)		31.2	99% Chebyshev (MVUE) UCL			76.64
Gamma Distribution Test			Data Distribution			
k star (bias corrected)		2.406	Data appear Normal at 5% Significance Level			
Theta Star		10.61				
MLE of Mean		25.53				
MLE of Standard Deviation		16.46				
nu star		76.99				
Approximate Chi Square Value (.05)		57.78	Nonparametric Statistics			
Adjusted Level of Significance		0.0335	95% CLT UCL		30.87	
Adjusted Chi Square Value		55.89	95% Jackknife UCL		31.22	
			95% Standard Bootstrap UCL		30.7	
Anderson-Darling Test Statistic		0.518	95% Bootstrap-t UCL		30.81	
Anderson-Darling 5% Critical Value		0.745	95% Hall's Bootstrap UCL		30.66	
Kolmogorov-Smirnov Test Statistic		0.146	95% Percentile Bootstrap UCL		30.84	
Kolmogorov-Smirnov 5% Critical Value		0.217	95% BCA Bootstrap UCL		30.9	
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		39.67	
			97.5% Chebyshev(Mean, Sd) UCL		45.79	
			99% Chebyshev(Mean, Sd) UCL		57.82	
Assuming Gamma Distribution						
95% Approximate Gamma UCL (Use when n >= 40)		34.02				
95% Adjusted Gamma UCL (Use when n < 40)		35.17				
Potential UCL to Use			Use 95% Student's-t UCL			31.22
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.						
Note: For highly negative-skewed data, confidence limits						
(e.g., Chen, Johnson, Lognormal, and Gamma) may not be						
reliable. Chen's and Johnson's methods provide						
adjustments for positively skewed data sets.						

PROUCL OUTPUT - FORMER BUILDING 234 SUBSURFACE SOIL

IRON						
General Statistics						
Number of Valid Observations		16	Number of Distinct Observations		16	
Raw Statistics			Log-transformed Statistics			
Minimum		4060	Minimum of Log Data		8.309	
Maximum		50000	Maximum of Log Data		10.82	
Mean		26186	Mean of log Data		10.02	
Geometric Mean		22460	SD of log Data		0.652	
Median		27350				
SD		12257				
Std. Error of Mean		3064				
Coefficient of Variation		0.468				
Skewness		-0.113				
Relevant UCL Statistics						
Normal Distribution Test			Lognormal Distribution Test			
Shapiro Wilk Test Statistic		0.97	Shapiro Wilk Test Statistic		0.86	
Shapiro Wilk Critical Value		0.887	Shapiro Wilk Critical Value		0.887	
Data appear Normal at 5% Significance Level			Data not Lognormal at 5% Significance Level			
Assuming Normal Distribution			Assuming Lognormal Distribution			
95% Student's-t UCL		31558	95% H-UCL		40367	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL			47757
95% Adjusted-CLT UCL (Chen-1995)		31134	97.5% Chebyshev (MVUE) UCL			56588
95% Modified-t UCL (Johnson-1978)		31544	99% Chebyshev (MVUE) UCL			73935
Gamma Distribution Test			Data Distribution			
k star (bias corrected)		2.817	Data appear Normal at 5% Significance Level			
Theta Star		9297				
MLE of Mean		26186				
MLE of Standard Deviation		15603				
nu star		90.13				
Approximate Chi Square Value (.05)		69.24	Nonparametric Statistics			
Adjusted Level of Significance		0.0335	95% CLT UCL		31227	
Adjusted Chi Square Value		67.16	95% Jackknife UCL		31558	
			95% Standard Bootstrap UCL		31148	
Anderson-Darling Test Statistic		0.661	95% Bootstrap-t UCL		31508	
Anderson-Darling 5% Critical Value		0.743	95% Hall's Bootstrap UCL		31153	
Kolmogorov-Smirnov Test Statistic		0.218	95% Percentile Bootstrap UCL		30970	
Kolmogorov-Smirnov 5% Critical Value		0.216	95% BCA Bootstrap UCL		31131	
Data follow Appr. Gamma Distribution at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		39543	
			97.5% Chebyshev(Mean, Sd) UCL		45323	
			99% Chebyshev(Mean, Sd) UCL		56675	
Assuming Gamma Distribution						
95% Approximate Gamma UCL (Use when n >= 40)		34087				
95% Adjusted Gamma UCL (Use when n < 40)		35144				
Potential UCL to Use			Use 95% Student's-t UCL		31558	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.						
Note: For highly negative-skewed data, confidence limits						
(e.g., Chen, Johnson, Lognormal, and Gamma) may not be						
reliable. Chen's and Johnson's methods provide						
adjustments for positively skewed data sets.						

PROUCL OUTPUT - FORMER BUILDING 234 SUBSURFACE SOIL

MANGANESE			
General Statistics			
Number of Valid Observations	16	Number of Distinct Observations	16
Raw Statistics		Log-transformed Statistics	
Minimum	78.6	Minimum of Log Data	4.364
Maximum	2450	Maximum of Log Data	7.804
Mean	450	Mean of log Data	5.723
Geometric Mean	305.8	SD of log Data	0.842
Median	343		
SD	559.5		
Std. Error of Mean	139.9		
Coefficient of Variation	1.244		
Skewness	3.407		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.551	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	695.2	95% H-UCL	746.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	
95% Adjusted-CLT UCL (Chen-1995)	807.4	97.5% Chebyshev (MVUE) UCL	1024
95% Modified-t UCL (Johnson-1978)	715	99% Chebyshev (MVUE) UCL	1380
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.21	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	371.8		
MLE of Mean	450		
MLE of Standard Deviation	409		
nu star	38.72		
Approximate Chi Square Value (.05)	25.47	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	680.1
Adjusted Chi Square Value	24.25	95% Jackknife UCL	695.2
		95% Standard Bootstrap UCL	667.4
Anderson-Darling Test Statistic	0.838	95% Bootstrap-t UCL	1158
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	1694
Kolmogorov-Smirnov Test Statistic	0.215	95% Percentile Bootstrap UCL	705
Kolmogorov-Smirnov 5% Critical Value	0.219	95% BCA Bootstrap UCL	852.3
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1060
		97.5% Chebyshev(Mean, Sd) UCL	1324
		99% Chebyshev(Mean, Sd) UCL	1842
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	684.1		
95% Adjusted Gamma UCL (Use when n < 40)	718.5		
Potential UCL to Use		Use 95% Approximate Gamma UCL	684.1
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

South Waterfront

Subsurface Soil

PROCUCL OUTPUT - SOUTH WATERFRON SUBSURFACE SOIL

			General UCL Statistics for Full Data Sets										
User Selected Options													
From File			C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - South Waterfr										
Full Precision			OFF										
Confidence Coefficient			95%										
Number of Bootstrap Operations			2000										
ALUMINUM													
General Statistics													
Number of Valid Observations			6		Number of Distinct Observations			6					
Raw Statistics						Log-transformed Statistics							
			Minimum			5860			Minimum of Log Data			8.676	
			Maximum			17400			Maximum of Log Data			9.764	
			Mean			12018			Mean of log Data			9.322	
			Geometric Mean			11185			SD of log Data			0.434	
			Median			12750							
			SD			4577							
			Std. Error of Mean			1869							
			Coefficient of Variation			0.381							
			Skewness			-0.35							
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!													
It is suggested to collect at least 8 to 10 observations using these statistical methods!													
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
Warning: There are only 6 Values in this data													
Note: It should be noted that even though bootstrap methods may be performed on this data set,													
the resulting calculations may not be reliable enough to draw conclusions													
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.													
Relevant UCL Statistics													
Normal Distribution Test						Lognormal Distribution Test							
			Shapiro Wilk Test Statistic			0.937			Shapiro Wilk Test Statistic			0.903	
			Shapiro Wilk Critical Value			0.788			Shapiro Wilk Critical Value			0.788	
Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level							
Assuming Normal Distribution						Assuming Lognormal Distribution							
			95% Student's-t UCL			15783			95% H-UCL			19907	
95% UCLs (Adjusted for Skewness)						95% Chebyshev (MVUE) UCL						21410	
			95% Adjusted-CLT UCL (Chen-1995)			14806			97.5% Chebyshev (MVUE) UCL			25444	
			95% Modified-t UCL (Johnson-1978)			15739			99% Chebyshev (MVUE) UCL			33368	

PROCUCL OUTPUT - SOUTH WATERFRON SUBSURFACE SOIL

ALUMINUM (Continued)			
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	3.673	Data appear Normal at 5% Significance Level	
Theta Star	3272		
MLE of Mean	12018		
MLE of Standard Deviation	6271		
nu star	44.07		
Approximate Chi Square Value (.05)	29.85	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	15092
Adjusted Chi Square Value	25.7	95% Jackknife UCL	15783
		95% Standard Bootstrap UCL	14828
Anderson-Darling Test Statistic	0.347	95% Bootstrap-t UCL	15467
Anderson-Darling 5% Critical Value	0.698	95% Hall's Bootstrap UCL	14404
Kolmogorov-Smirnov Test Statistic	0.224	95% Percentile Bootstrap UCL	14717
Kolmogorov-Smirnov 5% Critical Value	0.333	95% BCA Bootstrap UCL	14717
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	20163
		97.5% Chebyshev(Mean, Sd) UCL	23687
		99% Chebyshev(Mean, Sd) UCL	30610
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	17746		
95% Adjusted Gamma UCL (Use when n < 40)	20614		
Potential UCL to Use		Use 95% Student's-t UCL	15783
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			
Note: For highly negative-skewed data, confidence limits			
(e.g., Chen, Johnson, Lognormal, and Gamma) may not be			
reliable. Chen's and Johnson's methods provide			
adjustments for positively skewed data sets.			

PROCUCL OUTPUT - SOUTH WATERFRON SUBSURFACE SOIL

ARSENIC					
General Statistics					
Number of Valid Observations		6	Number of Distinct Observations		6
Raw Statistics			Log-transformed Statistics		
Minimum		7.7	Minimum of Log Data		2.041
Maximum		26.3	Maximum of Log Data		3.27
Mean		17.08	Mean of log Data		2.725
Geometric Mean		15.25	SD of log Data		0.55
Median		18.75			
SD		7.98			
Std. Error of Mean		3.258			
Coefficient of Variation		0.467			
Skewness		-0.309			
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 6 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.885	Shapiro Wilk Test Statistic		0.833
Shapiro Wilk Critical Value		0.788	Shapiro Wilk Critical Value		0.788
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		23.65	95% H-UCL		34.99
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		34.12
95% Adjusted-CLT UCL (Chen-1995)		22	97.5% Chebyshev (MVUE) UCL		41.42
95% Modified-t UCL (Johnson-1978)		23.58	99% Chebyshev (MVUE) UCL		55.75
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		2.395	Data appear Normal at 5% Significance Level		
Theta Star		7.132			
MLE of Mean		17.08			
MLE of Standard Deviation		11.04			
nu star		28.74			
Approximate Chi Square Value (.05)		17.51	Nonparametric Statistics		
Adjusted Level of Significance		0.0122	95% CLT UCL		22.44
Adjusted Chi Square Value		14.44	95% Jackknife UCL		23.65
			95% Standard Bootstrap UCL		21.99
Anderson-Darling Test Statistic		0.516	95% Bootstrap-t UCL		23.68
Anderson-Darling 5% Critical Value		0.699	95% Hall's Bootstrap UCL		20.79
Kolmogorov-Smirnov Test Statistic		0.25	95% Percentile Bootstrap UCL		21.8
Kolmogorov-Smirnov 5% Critical Value		0.333	95% BCA Bootstrap UCL		21.4
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		31.28
			97.5% Chebyshev(Mean, Sd) UCL		37.43
			99% Chebyshev(Mean, Sd) UCL		49.5
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		28.05			
95% Adjusted Gamma UCL (Use when n < 40)		34.01			
Potential UCL to Use			Use 95% Student's-t UCL 23.65		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.					

PROCUCL OUTPUT - SOUTH WATERFRON SUBSURFACE SOIL

CHROMIUM				
General Statistics				
Number of Valid Observations		6	Number of Distinct Observations	
			6	
Raw Statistics		Log-transformed Statistics		
Minimum	6.6	Minimum of Log Data	1.887	
Maximum	21.2	Maximum of Log Data	3.054	
Mean	14.73	Mean of log Data	2.624	
Geometric Mean	13.79	SD of log Data	0.424	
Median	15.75			
SD	5.251			
Std. Error of Mean	2.144			
Coefficient of Variation	0.356			
Skewness	-0.573			
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!				
It is suggested to collect at least 8 to 10 observations using these statistical methods!				
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
Warning: There are only 6 Values in this data				
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions				
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.				
Relevant UCL Statistics				
Normal Distribution Test		Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.971	Shapiro Wilk Test Statistic	0.906	
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788	
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution		Assuming Lognormal Distribution		
95% Student's-t UCL	19.05	95% H-UCL	24.08	
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	26.05	
95% Adjusted-CLT UCL (Chen-1995)	17.72	97.5% Chebyshev (MVUE) UCL	30.9	
95% Modified-t UCL (Johnson-1978)	18.97	99% Chebyshev (MVUE) UCL	40.41	
Gamma Distribution Test		Data Distribution		
k star (bias corrected)	3.961	Data appear Normal at 5% Significance Level		
Theta Star	3.719			
MLE of Mean	14.73			
MLE of Standard Deviation	7.403			
nu star	47.54			
Approximate Chi Square Value (.05)	32.71	Nonparametric Statistics		
Adjusted Level of Significance	0.0122	95% CLT UCL	18.26	
Adjusted Chi Square Value	28.34	95% Jackknife UCL	19.05	
		95% Standard Bootstrap UCL	17.85	
Anderson-Darling Test Statistic	0.308	95% Bootstrap-t UCL	18.54	
Anderson-Darling 5% Critical Value	0.698	95% Hall's Bootstrap UCL	17.68	
Kolmogorov-Smirnov Test Statistic	0.234	95% Percentile Bootstrap UCL	17.85	
Kolmogorov-Smirnov 5% Critical Value	0.333	95% BCA Bootstrap UCL	17.57	
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	24.08	
		97.5% Chebyshev(Mean, Sd) UCL	28.12	
		99% Chebyshev(Mean, Sd) UCL	36.06	
Assuming Gamma Distribution				
95% Approximate Gamma UCL (Use when n >= 40)	21.41			
95% Adjusted Gamma UCL (Use when n < 40)	24.71			
Potential UCL to Use		Use 95% Student's-t UCL		
			19.05	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.				
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.				
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.				

PROCUCL OUTPUT - SOUTH WATERFRON SUBSURFACE SOIL

COBALT				
General Statistics				
Number of Valid Observations		6	Number of Distinct Observations	
			6	
Raw Statistics			Log-transformed Statistics	
Minimum		4.4	Minimum of Log Data	
			1.482	
Maximum		29.9	Maximum of Log Data	
			3.398	
Mean		16.45	Mean of log Data	
			2.635	
Geometric Mean		13.95	SD of log Data	
			0.686	
Median		17.1		
SD		8.987		
Std. Error of Mean		3.669		
Coefficient of Variation		0.546		
Skewness		0.161		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!				
It is suggested to collect at least 8 to 10 observations using these statistical methods!				
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
Warning: There are only 6 Values in this data				
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions				
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.				
Relevant UCL Statistics				
Normal Distribution Test			Lognormal Distribution Test	
Shapiro Wilk Test Statistic		0.981	Shapiro Wilk Test Statistic	
			0.927	
Shapiro Wilk Critical Value		0.788	Shapiro Wilk Critical Value	
			0.788	
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution			Assuming Lognormal Distribution	
95% Student's-t UCL		23.84	95% H-UCL	
			46.12	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL	
			37.4	
95% Adjusted-CLT UCL (Chen-1995)		22.74	97.5% Chebyshev (MVUE) UCL	
			46.28	
95% Modified-t UCL (Johnson-1978)		23.88	99% Chebyshev (MVUE) UCL	
			63.72	
Gamma Distribution Test			Data Distribution	
k star (bias corrected)		1.706	Data appear Normal at 5% Significance Level	
Theta Star		9.641		
MLE of Mean		16.45		
MLE of Standard Deviation		12.59		
nu star		20.48		
Approximate Chi Square Value (.05)		11.2	Nonparametric Statistics	
Adjusted Level of Significance		0.0122	95% CLT UCL	
Adjusted Chi Square Value		8.834		
			22.49	
			95% Jackknife UCL	
			23.84	
			95% Standard Bootstrap UCL	
			21.89	
Anderson-Darling Test Statistic		0.255	95% Bootstrap-t UCL	
			23.93	
Anderson-Darling 5% Critical Value		0.701	95% Hall's Bootstrap UCL	
			23.51	
Kolmogorov-Smirnov Test Statistic		0.235	95% Percentile Bootstrap UCL	
			21.9	
Kolmogorov-Smirnov 5% Critical Value		0.334	95% BCA Bootstrap UCL	
			22.17	
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL	
			32.44	
			97.5% Chebyshev(Mean, Sd) UCL	
			39.36	
			99% Chebyshev(Mean, Sd) UCL	
			52.96	
Assuming Gamma Distribution				
95% Approximate Gamma UCL (Use when n >= 40)		30.07		
95% Adjusted Gamma UCL (Use when n < 40)		38.13		
Potential UCL to Use			Use 95% Student's-t UCL	
			23.84	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.				
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.				

PROCUCL OUTPUT - SOUTH WATERFRON SUBSURFACE SOIL

IRON				
General Statistics				
Number of Valid Observations		6	Number of Distinct Observations	
			6	
Raw Statistics			Log-transformed Statistics	
Minimum		16800	Minimum of Log Data	
			9.729	
Maximum		45500	Maximum of Log Data	
			10.73	
Mean		31883	Mean of log Data	
			10.3	
Geometric Mean		29813	SD of log Data	
			0.414	
Median		32450		
SD		12034		
Std. Error of Mean		4913		
Coefficient of Variation		0.377		
Skewness		-0.128		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!				
It is suggested to collect at least 8 to 10 observations using these statistical methods!				
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
Warning: There are only 6 Values in this data				
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions				
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.				
Relevant UCL Statistics				
Normal Distribution Test		Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.91	Shapiro Wilk Test Statistic	
			0.899	
Shapiro Wilk Critical Value		0.788	Shapiro Wilk Critical Value	
			0.788	
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution		Assuming Lognormal Distribution		
95% Student's-t UCL		41783	95% H-UCL	
			51073	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL	
			55558	
95% Adjusted-CLT UCL (Chen-1995)		39690	97.5% Chebyshev (MVUE) UCL	
			65753	
95% Modified-t UCL (Johnson-1978)		41740	99% Chebyshev (MVUE) UCL	
			85778	
Gamma Distribution Test		Data Distribution		
k star (bias corrected)		3.917	Data appear Normal at 5% Significance Level	
Theta Star		8140		
MLE of Mean		31883		
MLE of Standard Deviation		16110		
nu star		47		
Approximate Chi Square Value (.05)		32.27	Nonparametric Statistics	
Adjusted Level of Significance		0.0122	95% CLT UCL	
Adjusted Chi Square Value		27.93	39964	
			95% Jackknife UCL	
			41783	
Anderson-Darling Test Statistic		0.354	95% Standard Bootstrap UCL	
			39131	
Anderson-Darling 5% Critical Value		0.698	95% Bootstrap-t UCL	
			41090	
Kolmogorov-Smirnov Test Statistic		0.199	95% Hall's Bootstrap UCL	
			39686	
Kolmogorov-Smirnov 5% Critical Value		0.333	95% Percentile Bootstrap UCL	
			38933	
Data appear Gamma Distributed at 5% Significance Level			95% BCA Bootstrap UCL	
			38933	
			95% Chebyshev(Mean, Sd) UCL	
			53298	
			97.5% Chebyshev(Mean, Sd) UCL	
			62565	
			99% Chebyshev(Mean, Sd) UCL	
			80766	
Assuming Gamma Distribution				
95% Approximate Gamma UCL (Use when n >= 40)		46439		
95% Adjusted Gamma UCL (Use when n < 40)		53648		
Potential UCL to Use			Use 95% Student's-t UCL	
			41783	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.				
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.				
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.				

PROCUCL OUTPUT - SOUTH WATERFRON SUBSURFACE SOIL

MANGANESE					
General Statistics					
Number of Valid Observations			6	Number of Distinct Observations	
				6	
Raw Statistics			Log-transformed Statistics		
Minimum			104	Minimum of Log Data	
				4.644	
Maximum			800	Maximum of Log Data	
				6.685	
Mean			489.7	Mean of log Data	
				6.025	
Geometric Mean			413.5	SD of log Data	
				0.733	
Median			500		
SD			245.3		
Std. Error of Mean			100.1		
Coefficient of Variation			0.501		
Skewness			-0.468		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 6 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic			0.976	Shapiro Wilk Test Statistic	
				0.838	
Shapiro Wilk Critical Value			0.788	Shapiro Wilk Critical Value	
				0.788	
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL			691.5	95% H-UCL	
				1581	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		
				1180	
95% Adjusted-CLT UCL (Chen-1995)			633.9	97.5% Chebyshev (MVUE) UCL	
				1469	
95% Modified-t UCL (Johnson-1978)			688.3	99% Chebyshev (MVUE) UCL	
				2035	
Gamma Distribution Test			Data Distribution		
k star (bias corrected)			1.668	Data appear Normal at 5% Significance Level	
Theta Star			293.6		
MLE of Mean			489.7		
MLE of Standard Deviation			379.2		
nu star			20.01		
Approximate Chi Square Value (.05)			10.86	Nonparametric Statistics	
Adjusted Level of Significance			0.0122	95% CLT UCL	
Adjusted Chi Square Value			8.535		
				654.4	
Anderson-Darling Test Statistic			0.393	95% Jackknife UCL	
				691.5	
Anderson-Darling 5% Critical Value			0.701	95% Standard Bootstrap UCL	
				639.8	
Kolmogorov-Smirnov Test Statistic			0.24	95% Bootstrap-t UCL	
				678.6	
Kolmogorov-Smirnov 5% Critical Value			0.334	95% Hall's Bootstrap UCL	
				671.8	
Data appear Gamma Distributed at 5% Significance Level			95% Percentile Bootstrap UCL		
				644.3	
				95% BCA Bootstrap UCL	
				632.2	
				95% Chebyshev(Mean, Sd) UCL	
				926.2	
				97.5% Chebyshev(Mean, Sd) UCL	
				1115	
				99% Chebyshev(Mean, Sd) UCL	
				1486	
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)			902.3		
95% Adjusted Gamma UCL (Use when n < 40)			1148		
Potential UCL to Use			Use 95% Student's-t UCL		
				691.5	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.					

PCB Removal Area

Subsurface Soil

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

	General UCL Statistics for Data Sets with Non-Detects			
User Selected Options				
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - PCB Removal			
Full Precision	OFF			
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
BENZO(A)ANTHRACENE				
General Statistics				
Number of Valid Data	7	Number of Detected Data	6	
Number of Distinct Detected Data	6	Number of Non-Detect Data	1	
		Percent Non-Detects	14.29%	
Raw Statistics		Log-transformed Statistics		
Minimum Detected	32.5	Minimum Detected	3.481	
Maximum Detected	252	Maximum Detected	5.529	
Mean of Detected	85.73	Mean of Detected	4.162	
SD of Detected	84.11	SD of Detected	0.764	
Minimum Non-Detect	360	Minimum Non-Detect	5.886	
Maximum Non-Detect	360	Maximum Non-Detect	5.886	
Warning: There are only 6 Detected Values in this data				
Note: It should be noted that even though bootstrap may be performed on this data set				
the resulting calculations may not be reliable enough to draw conclusions				
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.				
UCL Statistics				
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.7	Shapiro Wilk Test Statistic	0.868	
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788	
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution		Assuming Lognormal Distribution		
DL/2 Substitution Method		DL/2 Substitution Method		
Mean	99.2	Mean	4.31	
SD	84.65	SD	0.799	
95% DL/2 (t) UCL	161.4	95% H-Stat (DL/2) UCL	286.1	
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method		
MLE method failed to converge properly		Mean in Log Scale	4.162	
		SD in Log Scale	0.697	
		Mean in Original Scale	82.66	
		SD in Original Scale	77.22	
		95% t UCL	139.4	
		95% Percentile Bootstrap UCL	131.1	
		95% BCA Bootstrap UCL	146.8	
		95% H-UCL	186.9	

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

BENZO(A)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.051	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	81.55		
nu star	12.62		
A-D Test Statistic	0.598	Nonparametric Statistics	
5% A-D Critical Value	0.705	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.705	Mean	85.73
5% K-S Critical Value	0.336	SD	76.79
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	34.34
		95% KM (t) UCL	152.5
Assuming Gamma Distribution		95% KM (z) UCL	142.2
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	153.4
Minimum	32.5	95% KM (bootstrap t) UCL	383.4
Maximum	252	95% KM (BCA) UCL	146.1
Mean	85.67	95% KM (Percentile Bootstrap) UCL	145.1
Median	60.5	95% KM (Chebyshev) UCL	235.4
SD	76.79	97.5% KM (Chebyshev) UCL	300.2
k star	1.336	99% KM (Chebyshev) UCL	427.4
Theta star	64.12		
Nu star	18.7	Potential UCLs to Use	
AppChi2	9.901	95% KM (BCA) UCL	146.1
95% Gamma Approximate UCL (Use when n >= 40)	161.8		
95% Adjusted Gamma UCL (Use when n < 40)	199.2		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

BENZO(A)PYRENE			
General Statistics			
Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
		Percent Non-Detects	14.29%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	18.9	Minimum Detected	2.939
Maximum Detected	172	Maximum Detected	5.147
Mean of Detected	62.07	Mean of Detected	3.811
SD of Detected	59.07	SD of Detected	0.833
Minimum Non-Detect	360	Minimum Non-Detect	5.886
Maximum Non-Detect	360	Maximum Non-Detect	5.886
Warning: There are only 6 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.774	Shapiro Wilk Test Statistic	0.911
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	78.91	Mean	4.008
SD	69.96	SD	0.922
95% DL/2 (t) UCL	130.3	95% H-Stat (DL/2) UCL	312.4
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	3.811
		SD in Log Scale	0.76
		Mean in Original Scale	59.66
		SD in Original Scale	54.3
		95% t UCL	99.54
		95% Percentile Bootstrap UCL	94.8
		95% BCA Bootstrap UCL	105.3
		95% H-UCL	155.6
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.973	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	63.79		
nu star	11.68		
A-D Test Statistic	0.482	Nonparametric Statistics	
5% A-D Critical Value	0.706	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.706	Mean	62.07
5% K-S Critical Value	0.337	SD	53.93
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	24.12
		95% KM (t) UCL	108.9
		95% KM (z) UCL	101.7
		95% KM (jackknife) UCL	109.6
		95% KM (bootstrap t) UCL	362.6
		95% KM (BCA) UCL	108
		95% KM (Percentile Bootstrap) UCL	102.6
		95% KM (Chebyshev) UCL	167.2
		97.5% KM (Chebyshev) UCL	212.7
		99% KM (Chebyshev) UCL	302
Assuming Gamma Distribution		Potential UCLs to Use	
Gamma ROS Statistics using Extrapolated Data		95% KM (Chebyshev) UCL	167.2
Minimum	18.9		
Maximum	172		
Mean	61.9		
Median	38.3		
SD	53.93		
k star	1.232		
Theta star	50.25		
Nu star	17.24		
AppChi2	8.847		
95% Gamma Approximate UCL (Use when n >= 40)	120.6		
95% Adjusted Gamma UCL (Use when n < 40)	150.2		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

BENZO(B)FLUORANTHENE			
General Statistics			
Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
		Percent Non-Detects	14.29%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	26.6	Minimum Detected	3.281
Maximum Detected	336	Maximum Detected	5.817
Mean of Detected	109	Mean of Detected	4.27
SD of Detected	119.8	SD of Detected	0.956
Minimum Non-Detect	360	Minimum Non-Detect	5.886
Maximum Non-Detect	360	Maximum Non-Detect	5.886
Warning: There are only 6 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.746	Shapiro Wilk Test Statistic	0.906
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	119.1	Mean	4.402
SD	112.6	SD	0.94
95% DL/2 (t) UCL	201.8	95% H-Stat (DL/2) UCL	491.1
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	4.27
		SD in Log Scale	0.872
		Mean in Original Scale	103.6
		SD in Original Scale	110.2
		95% t UCL	184.6
		95% Percentile Bootstrap UCL	171.4
		95% BCA Bootstrap UCL	205.3
		95% H-UCL	344.4
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.776	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	140.4		
nu star	9.31		
A-D Test Statistic	0.517	Nonparametric Statistics	
5% A-D Critical Value	0.71	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.71	Mean	109
5% K-S Critical Value	0.339	SD	109.3
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	48.89
		95% KM (t) UCL	204
		95% KM (z) UCL	189.4
		95% KM (jackknife) UCL	205.3
		95% KM (bootstrap t) UCL	762.3
		95% KM (BCA) UCL	191.4
		95% KM (Percentile Bootstrap) UCL	189.3
		95% KM (Chebyshev) UCL	322.1
		97.5% KM (Chebyshev) UCL	414.3
		99% KM (Chebyshev) UCL	595.4
Assuming Gamma Distribution		Potential UCLs to Use	
Gamma ROS Statistics using Extrapolated Data		95% KM (Chebyshev) UCL	322.1
Minimum	26.6		
Maximum	336		
Mean	107.8		
Median	57.9		
SD	109.4		
k star	0.969		
Theta star	111.2		
Nu star	13.57		
AppChi2	6.277		
95% Gamma Approximate UCL (Use when n >= 40)	233		
95% Adjusted Gamma UCL (Use when n < 40)	300.8		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

DIBENZO(A,H)ANTHRACENE			
General Statistics			
Number of Valid Data	6	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	3
		Percent Non-Detects	50.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	7.48	Minimum Detected	2.012
Maximum Detected	43.7	Maximum Detected	3.777
Mean of Detected	19.69	Mean of Detected	2.618
SD of Detected	20.79	SD of Detected	1.004
Minimum Non-Detect	3.83	Minimum Non-Detect	1.343
Maximum Non-Detect	360	Maximum Non-Detect	5.886
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	6
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There are only 3 Distinct Detected Values in this data set			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.758	Shapiro Wilk Test Statistic	0.773
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	40.49	Mean	2.394
SD	70.14	SD	1.79
95% DL/2 (t) UCL	98.19	95% H-Stat (DL/2) UCL	13998
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	1.493
		SD in Log Scale	1.517
		Mean in Original Scale	10.86
		SD in Original Scale	16.38
		95% t UCL	24.33
		95% Percentile Bootstrap UCL	23.44
		95% BCA Bootstrap UCL	24.65
		95% H-UCL	791.7

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

DIBENZO(A,H)ANTHRACENE (Continued)			
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data appear Lognormal at 5% Significance Level	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	14.81
5% K-S Critical Value	N/A	SD	14.45
Data not Gamma Distributed at 5% Significance Level		SE of Mean	7.913
		95% KM (t) UCL	30.75
Assuming Gamma Distribution		95% KM (z) UCL	27.82
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	29.58
Minimum	N/A	95% KM (bootstrap t) UCL	690.1
Maximum	N/A	95% KM (BCA) UCL	43.7
Mean	N/A	95% KM (Percentile Bootstrap) UCL	43.7
Median	N/A	95% KM (Chebyshev) UCL	49.3
SD	N/A	97.5% KM (Chebyshev) UCL	64.23
k star	N/A	99% KM (Chebyshev) UCL	93.54
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (BCA) UCL	43.7
95% Gamma Approximate UCL (Use when n >= 40)	N/A		
95% Adjusted Gamma UCL (Use when n < 40)	N/A		
Note: DL/2 is not a recommended method.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

General UCL Statistics for Full Data Sets	
User Selected Options	
From File	C:\Work Folders\Projects\Newport\Derecktor\Draft Final Risk Assessment\EPCs\Subsurface Soil - PCB Removal
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000
ALUMINUM	
General Statistics	
Number of Valid Observations	6
Number of Distinct Observations	6
Raw Statistics	Log-transformed Statistics
Minimum	2180
Maximum	19900
Mean	11338
Geometric Mean	9492
Median	12100
SD	5745
Std. Error of Mean	2345
Coefficient of Variation	0.507
Skewness	-0.233
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates! It is suggested to collect at least 8 to 10 observations using these statistical methods! If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.	
Warning: There are only 6 Values in this data Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions	
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.	
Relevant UCL Statistics	
Normal Distribution Test	Lognormal Distribution Test
Shapiro Wilk Test Statistic	0.937
Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

ALUMINUM (Continued)			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	16065	95% H-UCL	40027
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	28207
95% Adjusted-CLT UCL (Chen-1995)	14958	97.5% Chebyshev (MVUE) UCL	35218
95% Modified-t UCL (Johnson-1978)	16027	99% Chebyshev (MVUE) UCL	48989
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.596	Data appear Normal at 5% Significance Level	
Theta Star	7105		
MLE of Mean	11338		
MLE of Standard Deviation	8975		
nu star	19.15		
Approximate Chi Square Value (.05)	10.23	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	15196
Adjusted Chi Square Value	7.983	95% Jackknife UCL	16065
		95% Standard Bootstrap UCL	14878
Anderson-Darling Test Statistic	0.573	95% Bootstrap-t UCL	15406
Anderson-Darling 5% Critical Value	0.701	95% Hall's Bootstrap UCL	15718
Kolmogorov-Smirnov Test Statistic	0.27	95% Percentile Bootstrap UCL	14867
Kolmogorov-Smirnov 5% Critical Value	0.335	95% BCA Bootstrap UCL	14425
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	21562
		97.5% Chebyshev(Mean, Sd) UCL	25986
		99% Chebyshev(Mean, Sd) UCL	34676
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	21231		
95% Adjusted Gamma UCL (Use when n < 40)	27200		
Potential UCL to Use		Use 95% Student's-t UCL 16065	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.			

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

ARSENIC			
General Statistics			
Number of Valid Observations	7	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	1.47	Minimum of Log Data	0.385
Maximum	47.2	Maximum of Log Data	3.854
Mean	16.3	Mean of log Data	2.436
Geometric Mean	11.43	SD of log Data	1.031
Median	13		
SD	14.38		
Std. Error of Mean	5.435		
Coefficient of Variation	0.882		
Skewness	2.037		
Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!			
It is suggested to collect at least 8 to 10 observations using these statistical methods!			
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
Warning: There are only 7 Values in this data			
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions			
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.736	Shapiro Wilk Test Statistic	0.824
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.803
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	26.86	95% H-UCL	95.69
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	47.62
95% Adjusted-CLT UCL (Chen-1995)	29.71	97.5% Chebyshev (MVUE) UCL	60.61
95% Modified-t UCL (Johnson-1978)	27.56	99% Chebyshev (MVUE) UCL	86.12
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.985	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	16.55		
MLE of Mean	16.3		
MLE of Standard Deviation	16.42		
nu star	13.78		
Approximate Chi Square Value (.05)	6.423	Nonparametric Statistics	
Adjusted Level of Significance	0.0158	95% CLT UCL	25.24
Adjusted Chi Square Value	4.988	95% Jackknife UCL	26.86
		95% Standard Bootstrap UCL	24.61
Anderson-Darling Test Statistic	0.651	95% Bootstrap-t UCL	39.63
Anderson-Darling 5% Critical Value	0.721	95% Hall's Bootstrap UCL	73.15
Kolmogorov-Smirnov Test Statistic	0.288	95% Percentile Bootstrap UCL	26.08
Kolmogorov-Smirnov 5% Critical Value	0.317	95% BCA Bootstrap UCL	28.94
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	39.99
		97.5% Chebyshev(Mean, Sd) UCL	50.24
		99% Chebyshev(Mean, Sd) UCL	70.38
Assuming Gamma Distribution			
95% Approximate Gamma UCL (Use when n >= 40)	34.97		
95% Adjusted Gamma UCL (Use when n < 40)	45.03		
Potential UCL to Use		Use 95% Approximate Gamma UCL	34.97
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

CHROMIUM				
General Statistics				
Number of Valid Observations		7	Number of Distinct Observations	
			7	
Raw Statistics		Log-transformed Statistics		
Minimum	0.788	Minimum of Log Data		-0.238
Maximum	25.6	Maximum of Log Data		3.243
Mean	13.41	Mean of log Data		2.271
Geometric Mean	9.686	SD of log Data		1.151
Median	12			
SD	7.688			
Std. Error of Mean	2.906			
Coefficient of Variation	0.573			
Skewness	-0.0569			
Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!				
It is suggested to collect at least 8 to 10 observations using these statistical methods!				
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
Warning: There are only 7 Values in this data				
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions				
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.				
Relevant UCL Statistics				
Normal Distribution Test		Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.973	Shapiro Wilk Test Statistic		0.722
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value		0.803
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level		
Assuming Normal Distribution		Assuming Lognormal Distribution		
95% Student's-t UCL	19.06	95% H-UCL		131.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL		47.77
95% Adjusted-CLT UCL (Chen-1995)	18.13	97.5% Chebyshev (MVUE) UCL		61.3
95% Modified-t UCL (Johnson-1978)	19.05	99% Chebyshev (MVUE) UCL		87.87
Gamma Distribution Test		Data Distribution		
k star (bias corrected)	1.057	Data appear Normal at 5% Significance Level		
Theta Star	12.69			
MLE of Mean	13.41			
MLE of Standard Deviation	13.04			
nu star	14.8			
Approximate Chi Square Value (.05)	7.124	Nonparametric Statistics		
Adjusted Level of Significance	0.0158	95% CLT UCL		18.19
Adjusted Chi Square Value	5.596	95% Jackknife UCL		19.06
		95% Standard Bootstrap UCL		17.78
Anderson-Darling Test Statistic	0.663	95% Bootstrap-t UCL		19.12
Anderson-Darling 5% Critical Value	0.719	95% Hall's Bootstrap UCL		19.29
Kolmogorov-Smirnov Test Statistic	0.318	95% Percentile Bootstrap UCL		17.74
Kolmogorov-Smirnov 5% Critical Value	0.316	95% BCA Bootstrap UCL		17.73
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL		26.08
		97.5% Chebyshev(Mean, Sd) UCL		31.56
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL		42.33
95% Approximate Gamma UCL (Use when n >= 40)	27.87			
95% Adjusted Gamma UCL (Use when n < 40)	35.48			
Potential UCL to Use		Use 95% Student's-t UCL		
		19.06		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.				
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.				
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.				

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

COBALT					
General Statistics					
Number of Valid Observations		6	Number of Distinct Observations		6
Raw Statistics			Log-transformed Statistics		
Minimum		1.29	Minimum of Log Data		0.255
Maximum		24	Maximum of Log Data		3.178
Mean		12.42	Mean of log Data		2.227
Geometric Mean		9.268	SD of log Data		1.028
Median		11.75			
SD		7.67			
Std. Error of Mean		3.131			
Coefficient of Variation		0.617			
Skewness		0.143			
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 6 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.986	Shapiro Wilk Test Statistic		0.816
Shapiro Wilk Critical Value		0.788	Shapiro Wilk Critical Value		0.788
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		18.73	95% H-UCL		109.6
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		39.26
95% Adjusted-CLT UCL (Chen-1995)		17.77	97.5% Chebyshev (MVUE) UCL		50.18
95% Modified-t UCL (Johnson-1978)		18.76	99% Chebyshev (MVUE) UCL		71.61
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		1.039	Data appear Normal at 5% Significance Level		
Theta Star		11.96			
MLE of Mean		12.42			
MLE of Standard Deviation		12.19			
nu star		12.47			
Approximate Chi Square Value (.05)		5.537	Nonparametric Statistics		
Adjusted Level of Significance		0.0122	95% CLT UCL		17.57
Adjusted Chi Square Value		3.992	95% Jackknife UCL		18.73
			95% Standard Bootstrap UCL		17.06
Anderson-Darling Test Statistic		0.404	95% Bootstrap-t UCL		19.68
Anderson-Darling 5% Critical Value		0.705	95% Hall's Bootstrap UCL		21.99
Kolmogorov-Smirnov Test Statistic		0.255	95% Percentile Bootstrap UCL		17.38
Kolmogorov-Smirnov 5% Critical Value		0.336	95% BCA Bootstrap UCL		17.12
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		26.07
			97.5% Chebyshev(Mean, Sd) UCL		31.98
Assuming Gamma Distribution			99% Chebyshev(Mean, Sd) UCL		43.58
95% Approximate Gamma UCL (Use when n >= 40)		27.97			
95% Adjusted Gamma UCL (Use when n < 40)		38.81			
Potential UCL to Use			Use 95% Student's-t UCL		18.73
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

IRON					
General Statistics					
Number of Valid Observations			6	Number of Distinct Observations	
				6	
Raw Statistics			Log-transformed Statistics		
Minimum		6800	Minimum of Log Data		8.825
Maximum		43600	Maximum of Log Data		10.68
Mean		27150	Mean of log Data		10.07
Geometric Mean		23572	SD of log Data		0.66
Median		27250			
SD		12755			
Std. Error of Mean		5207			
Coefficient of Variation		0.47			
Skewness		-0.495			
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 6 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic		0.976	Shapiro Wilk Test Statistic		0.843
Shapiro Wilk Critical Value		0.788	Shapiro Wilk Critical Value		0.788
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL		37643	95% H-UCL		72250
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		61057
95% Adjusted-CLT UCL (Chen-1995)		34590	97.5% Chebyshev (MVUE) UCL		75301
95% Modified-t UCL (Johnson-1978)		37467	99% Chebyshev (MVUE) UCL		103281
Gamma Distribution Test			Data Distribution		
k star (bias corrected)		1.959	Data appear Normal at 5% Significance Level		
Theta Star		13857			
MLE of Mean		27150			
MLE of Standard Deviation		19397			
nu star		23.51			
Approximate Chi Square Value (.05)		13.48	Nonparametric Statistics		
Adjusted Level of Significance		0.0122	95% CLT UCL		35715
Adjusted Chi Square Value		10.84	95% Jackknife UCL		37643
			95% Standard Bootstrap UCL		35203
Anderson-Darling Test Statistic		0.388	95% Bootstrap-t UCL		36720
Anderson-Darling 5% Critical Value		0.7	95% Hall's Bootstrap UCL		35500
Kolmogorov-Smirnov Test Statistic		0.252	95% Percentile Bootstrap UCL		35333
Kolmogorov-Smirnov 5% Critical Value		0.334	95% BCA Bootstrap UCL		33867
Data appear Gamma Distributed at 5% Significance Level			95% Chebyshev(Mean, Sd) UCL		49848
			97.5% Chebyshev(Mean, Sd) UCL		59669
			99% Chebyshev(Mean, Sd) UCL		78961
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)		47363			
95% Adjusted Gamma UCL (Use when n < 40)		58901			
Potential UCL to Use			Use 95% Student's-t UCL		37643
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					
Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.					

PROUCL OUTPUT - PCB REMOVAL AREA SUBSURFACE SOIL

MANGANESE					
General Statistics					
Number of Valid Observations			6	Number of Distinct Observations	
				6	
Raw Statistics			Log-transformed Statistics		
Minimum			305	Minimum of Log Data	
				5.72	
Maximum			1190	Maximum of Log Data	
				7.082	
Mean			520.3	Mean of log Data	
				6.132	
Geometric Mean			460.4	SD of log Data	
				0.495	
Median			393		
SD			334.9		
Std. Error of Mean			136.7		
Coefficient of Variation			0.644		
Skewness			2.236		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!					
It is suggested to collect at least 8 to 10 observations using these statistical methods!					
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
Warning: There are only 6 Values in this data					
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions					
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.					
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
Shapiro Wilk Test Statistic			0.679	Shapiro Wilk Test Statistic	
				0.802	
Shapiro Wilk Critical Value			0.788	Shapiro Wilk Critical Value	
				0.788	
Data not Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL			795.8	95% H-UCL	
				931.4	
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL		
				957.5	
95% Adjusted-CLT UCL (Chen-1995)			878.6	97.5% Chebyshev (MVUE) UCL	
				1151	
95% Modified-t UCL (Johnson-1978)			816.6	99% Chebyshev (MVUE) UCL	
				1532	
Gamma Distribution Test			Data Distribution		
k star (bias corrected)			2.234	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star			232.9		
MLE of Mean			520.3		
MLE of Standard Deviation			348.1		
nu star			26.81		
Approximate Chi Square Value (.05)			16	Nonparametric Statistics	
Adjusted Level of Significance			0.0122	95% CLT UCL	
Adjusted Chi Square Value			13.09	745.2	
				95% Jackknife UCL	
				795.8	
Anderson-Darling Test Statistic			0.767	95% Standard Bootstrap UCL	
				725.5	
Anderson-Darling 5% Critical Value			0.7	95% Bootstrap-t UCL	
				1729	
Kolmogorov-Smirnov Test Statistic			0.309	95% Hall's Bootstrap UCL	
				1678	
Kolmogorov-Smirnov 5% Critical Value			0.333	95% Percentile Bootstrap UCL	
				776.8	
Data follow Appr. Gamma Distribution at 5% Significance Level				95% BCA Bootstrap UCL	
				817.7	
				95% Chebyshev(Mean, Sd) UCL	
				1116	
				97.5% Chebyshev(Mean, Sd) UCL	
				1374	
				99% Chebyshev(Mean, Sd) UCL	
				1881	
Assuming Gamma Distribution					
95% Approximate Gamma UCL (Use when n >= 40)			871.6		
95% Adjusted Gamma UCL (Use when n < 40)			1066		
Potential UCL to Use			Use 95% Approximate Gamma UCL		
				871.6	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

APPENDIX F.4

SAMPLE CALCULATIONS

CALCULATION WORKSHEET

Page 1 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL CONSTRUCTION WORKERS		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	CHECKED BY: <i>L. Cufani</i>	DATE: 9/14/2012

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from incidental ingestion of subsurface soil at the PCB removal area.

EQUATION:
$$IEX = \frac{CS \times IR \times EF \times ED \times FI \times CF}{BW \times AT}$$

Where:

IEX = estimated exposure intake (mg/kg/day)
Cs = exposure point concentration in soil (mg/kg)
IR = incidental ingestion rate (mg/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
FI = fraction ingested from contaminated source (unitless)
CF = conversion factor (1E-06 kg/mg)
BW = body weight (kg)
AT = averaging time (days)
CSFo = oral carcinogenic slope factor ((mg/kg/day)⁻¹)
RfDo = oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)⁻¹
HQ (Noncarcinogens) = Intake (mg/kg/day) / RfDo (mg/kg/day)

ASSUMPTIONS:

Cs = 35 mg/kg Chemical: Arsenic
IR = 330 mg/day
EF = 130 days/year
ED = 1 years
FI = 1
CF = 1E-06 kg/mg
BW = 70 kg
ATc = 25,550 days
ATnc = 365 days
CSFo = 1.5E+00 (mg/kg/day)⁻¹
RfDo = 3.0E-04 (mg/kg/day)

9/17/2012

CALCULATION WORKSHEET

Page 2 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL CONSTRUCTION WORKERS		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	CHECKED BY: <i>L. Giofani</i>	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$\text{IEXc} = \frac{35 \text{ mg/kg} \times 330 \text{ mg/day} \times 130 \text{ days/year} \times 1 \text{ years} \times 1 \times 1\text{E-}06 \text{ kg/mg}}{70 \text{ kg} \times 25550 \text{ days}}$$

$$\text{IEXc} = 8.40\text{E-}07 \text{ mg/kg/day}$$

$$\text{ILCR} = 8.40\text{E-}07 \text{ mg/kg/day} \times 1.50\text{E+}00 \text{ (mg/kg/day)}^{-1} = \text{Incremental Lifetime Cancer Risk}$$

$$\text{ILCR} = 1.3\text{E-}06$$

EXAMPLE NONCARCINOGENIC CALCULATION

$$\text{IEXnc} = \frac{35 \text{ mg/kg} \times 330 \text{ mg/day} \times 130 \text{ days/year} \times 1 \text{ years} \times 1 \times 1\text{E-}06 \text{ kg/mg}}{70 \text{ kg} \times 365 \text{ days}}$$

$$\text{IEXnc} = 5.88\text{E-}05 \text{ mg/kg/day}$$

$$\text{HQ} = 5.88\text{E-}05 \text{ mg/kg/day} / 3.00\text{E-}04 \text{ (mg/kg/day)} = \text{Hazard Quotient}$$

$$\text{HQ} = 2.0\text{E-}01$$

CALCULATION WORKSHEET

Page 1 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL CONSTRUCTION WORKERS		
BASED ON: USEPA, JULY 2004		
BY: R. JUPIN	CHECKED BY: <i>L. Cinfani</i>	DATE: 9/14/2012

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with subsurface soil at the PCB removal area.

EQUATION:
$$DEX = \frac{Cs \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Where:

DEX = estimated exposure intake (mg/kg/day)
Cs = exposure point concentration in soil (mg/kg)
CF = conversion factor (1E-06 kg/mg)
SA = skin surface available for contact (cm²/day)
ABS = absorption factor (unitless)
AF = adherence factor (mg/cm²)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time (days)
CSFd = dermal carcinogenic slope factor ((mg/kg/day)⁻¹)
RfDd = dermal noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFd (mg/kg/day)⁻¹
HQ (Noncarcinogens) = Intake (mg/kg/day) / RfDd (mg/kg/day)

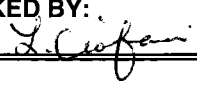
ASSUMPTIONS:

Cs = 35 mg/kg Chemical: Arsenic
CF = 1E-06 kg/mg
SA = 3,300 cm²/day
AF = 0.3 mg/cm²
ABS = 0.03
EF = 130 days/year
ED = 1 years
BW = 70 kg
ATc = 25,550 days
ATnc = 365 days
CSFd = 1.5E+00 (mg/kg/day)⁻¹
RfDd = 3.0E-04 (mg/kg/day)

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CALCULATION WORKSHEET

Page 2 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL CONSTRUCTION WORKERS		
BASED ON: USEPA, JULY 2004		
BY: R. JUPIN	CHECKED BY: 	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$\text{DEXc} = \frac{35 \text{ mg/kg} \times 1\text{E-}06 \text{ kg/mg} \times 3300 \text{ cm}^2/\text{day} \times 0.3 \text{ mg/cm}^2 \times 0.03 \times 130 \text{ days/year} \times 1 \text{ years}}{70 \text{ kg} \times 25550 \text{ days}}$$

$$\text{DEXc} = 7.56\text{E-}08 \text{ mg/kg/day}$$

$$\text{ILCR} = 7.56\text{E-}08 \text{ mg/kg/day} \times 1.50\text{E+}00 \text{ (mg/kg/day)}^{-1} = \text{Incremental Lifetime Cancer Risk}$$

$$\text{ILCR} = 1.1\text{E-}07$$

EXAMPLE NONCARCINOGENIC CALCULATION

$$\text{DEXnc} = \frac{35 \text{ mg/kg} \times 1\text{E-}06 \text{ kg/mg} \times 3300 \text{ cm}^2/\text{day} \times 0.3 \text{ mg/cm}^2 \times 0.03 \times 130 \text{ days/year} \times 1 \text{ years}}{70 \text{ kg} \times 365 \text{ days}}$$

$$\text{DEXnc} = 5.29\text{E-}06 \text{ mg/kg/day}$$

$$\text{HQ} = 5.29\text{E-}06 \text{ mg/kg/day} / 3.00\text{E-}04 \text{ (mg/kg/day)} = \text{Hazard Quotient}$$

$$\text{HQ} = 1.8\text{E-}02$$

CALCULATION WORKSHEET

Page 1 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS CONSTRUCTION WORKERS		
BASED ON: USEPA, JANUARY 2009		
BY: R. JUPIN	CHECKED BY: <i>L. Ciuffani</i>	DATE: 9/14/2012

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of subsurface soil at the PCB removal area.

EQUATION:
$$EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$$

Where:

EC = exposure concentration (mg/m³)
Ca = exposure point concentration in air (mg/m³)
= Cs x 1/PEF
Cs = exposure point concentration in soil (mg/kg)
PEF = particulate emission factor (m³/kg)
ET = exposure time (hrs/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time (hours)
IUR = inhalation unit risk ((ug/m³)⁻¹)
RfC = inhalation reference concentration (mg/m³)

RISKS:

ILCR (Carcinogens) = Exposure Concentration (mg/m³) x IURi (ug/m³)⁻¹ x 1000 ug/mg
HQ (Noncarcinogens) = Exposure Concentration (mg/m³) / RfCi (mg/m³)

ASSUMPTIONS:

Cs = 35 mg/kg Chemical: Arsenic
PEF = 1.40E+06 m³/kg
Ca = 2.50E-05 mg/m³
ET = 8 hours/day
EF = 130 days/year
ED = 1 years
ATc = 25,550 days
ATnc = 365 days
IUR = 4.3E-03 (ug/m³)⁻¹
RfC = 1.5E-05 (mg/m³)

9/17/2012

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS CONSTRUCTION WORKERS		
BASED ON: USEPA, JANUARY 2009		
BY: R. JUPIN	CHECKED BY: <i>L. Ciferri</i>	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$\text{IEXc} = \frac{2.50\text{E-}05 \text{ mg/m}^3 \times 8 \text{ hours/day} \times 130 \text{ days/year} \times 1 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}}$$

$$\text{IEXc} = 4.24\text{E-}08 \text{ mg/m}^3$$

$$\text{ILCR} = 4.24\text{E-}08 \text{ mg/m}^3 \times 4.30\text{E-}03 \text{ (ug/m}^3\text{)}^{-1} \times 1000 \text{ ug/mg} = \text{Incremental Lifetime Cancer Risk}$$

$$\text{ILCR} = 1.8\text{E-}07$$

EXAMPLE NONCARCINOGENIC CALCULATION

$$\text{IEXnc} = \frac{2.50\text{E-}05 \text{ mg/m}^3 \times 8 \text{ hours/day} \times 130 \text{ days/year} \times 1 \text{ years}}{365 \text{ days} \times 24 \text{ hours/day}}$$

$$\text{IEXnc} = 2.97\text{E-}06 \text{ mg/m}^3$$

$$\text{HQ} = 2.97\text{E-}06 \text{ mg/m}^3 / 1.50\text{E-}05 \text{ (mg/m}^3\text{)} = \text{Hazard Quotient}$$

$$\text{HQ} = 2.0\text{E-}01$$

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF PARTICULATE EMISSION FACTOR FOR CONSTRUCTION WORKERS		
BASED ON: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (USEPA, December 2002)		
BY: R. JUPIN	CHECKED BY: <i>L. J. J. J.</i>	DATE: 9/14/2012

Equation 5-5
Derivation of the Particulate Emission Factor
Construction Scenario - Construction Worker

$$PEF_{sc} = Q/C_{sr} \times \frac{1}{F_d} \times \left[\frac{T \times A_R}{556 \times (W/3)^{0.4} \times \frac{(365 \text{ d/yr} - p)}{365 \text{ d/yr}} \times \Sigma VKT} \right]$$

Parameter/Definition (units)	Default
PEF _{sc} /subchronic road particulate emission factor (m ³ /kg)	site-specific
Q/C _{sr} / inverse of the ratio of the 1-h geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/m ² -s per kg/m ³)	23.02* (Equation 5-6)
F _d /dispersion correction factor (unitless)	0.185 (Appendix E)
T/total time over which construction occurs (s)	site-specific
A _R /surface area of contaminated road segment (m ²)	274.213 (A _R = L _R × W _R × 0.092903m ² /ft ²)
L _R /length of road segment (ft)	
W _R /width of road segment (ft)	
W/mean vehicle weight (tons)	site-specific
p/number of days with at least 0.01 inches of precipitation (days/year)	site-specific (Exhibit 5-2)
ΣVKT/sum of fleet vehicle kilometers traveled during the exposure duration (km)	site-specific

* Assumes a 0.5 acre site

Calculation of PEF for Construction Workers

Q/C	23.02 (g/m ² -s per kg/m ³)	
F _d	0.185 dispersion correction factor (unitless)	
T	3.74E+06 sec	3600 sec/hr x 8hr/day x 130 days/yr
A _R	274.213 m ²	
W	8 tons	
p	135 day/year	
VKT	175.5 km	30 vehicles x 0.045 km/day x 130 days
PEF =	1.40E+06 m³/kg	

CALCULATION WORKSHEET

Page 1 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF THE PARTICULATE EMISSION FACTOR (PEF) FOR RESIDENTIAL AND COMMERCIAL/INDUSTRIAL EXPOSURES		
BASED ON: SUPPLEMENTAL GUIDANCE FOR DEVELOPING SOIL SCREENING LEVELS FOR SUPERFUND SITES (USEPA, DECEMBER, 2002)		
BY: R. JUPIN	CHECKED BY: <i>L. Carfani</i>	DATE: 9/14/2012

PURPOSE: To calculate the particulate emission factor for residential and commercial/industrial exposure scenarios.

EQUATIONS:

$$PEF = Q/C_{wind} \times \frac{3600 \text{ sec/hr}}{0.036 \times (1 - V) \times (U_m/U_t)^3 \times F(x)}$$

$$Q/C_{wind} = A \times \exp \left[\frac{(\ln A_{site} - B)^2}{C} \right]$$

Where:

- PEF = particulate emission factor (m³/kg)
 Q/C_{wind} = Inverse of mean conc. at center of source (g/m²-s per kg/m³).
 V = fraction of vegetative cover (unitless)
 U_m = mean annual windspeed (m/sec)
 U_t = equivalent threshold value of windspeed at 7m (m/sec)
 F(x) = function dependent on U_m/U_t derived using Cowherd et al. (1985) (unitless)
 A,B,C = constants based on air dispersion modeling for specific climate zones
 A_{site} = areal extent of the site or contamination (acres)

ASSUMPTIONS:

- | | | | | |
|-------------------|---|----------|----------|---------------------------------------|
| V | = | 0.5 | unitless | |
| U _m | = | 3.84 | m/sec | Values are for Hartford, Connecticut. |
| U _t | = | 11.32 | m/sec | |
| F(x) | = | 0.0345 | unitless | |
| A | = | 12.5907 | unitless | |
| B | = | 18.8368 | unitless | |
| C | = | 215.4377 | unitless | |
| A _{site} | = | 0.5 | acres | |

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CALCULATION WORKSHEET

Page 2 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF THE PARTICULATE EMISSION FACTOR (PEF) FOR RESIDENTIAL AND COMMERCIAL/INDUSTRIAL EXPOSURES		
BASED ON: SUPPLEMENTAL GUIDANCE FOR DEVELOPING SOIL SCREENING LEVELS FOR SUPERFUND SITES (USEPA, DECEMBER, 2002)		
BY: R. JUPIN	CHECKED BY: <i>L. Ciufani</i>	DATE: 9/14/2012

EXAMPLE CALCULATION FOR Q/C_{wind}

$$Q/C_{wind} = 12.5907 \times \exp[(\ln(0.5) - 18.8368)^2 / 215.4377]$$

$$Q/C_{wind} = 73.95045 \text{ g/m}^2\text{-s per kg/m}^3$$

EXAMPLE CALCULATION FOR PEF

$$PEF = 73.95045 \text{ g/m}^2\text{-s per kg/m}^3 \times \frac{3600 \text{ sec/hr}}{0.036 \times (1 - 0.5) \times (3.84 \text{ m/sec}/11.32 \text{ m/sec})^3 \times 0.0345}$$

$$PEF = 1.10E+10 \text{ m}^3/\text{kg}$$

CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	CHECKED BY: <i>L. Cioffi</i>	DATE: 9/14/2012

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from ingestion of groundwater at former Building 234.

EQUATION:
$$IEX = \frac{C_{gw} \times CF \times IR \times EF \times ED}{BW \times AT}$$

Where:

IEX = estimated exposure intake (mg/kg/day)
C_{gw} = exposure point concentration in groundwater (ug/L)
CF = conversion factor (1.0E-3 mg/ug)
IR = ingestion rate (L/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time (days)
CSFo = oral carcinogenic slope factor ((mg/kg/day)⁻¹)
RfDo = oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)⁻¹
HQ (Noncarcinogens) = Intake (mg/kg/day) / RfDo (mg/kg/day)

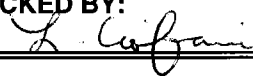
ASSUMPTIONS:

C_{gw} = 3.9 ug/L Chemical: Trichloroethene
IR = 1.4 L/day
CF = 1.0E-03 mg/ug
EF = 350 days/year
ED = 6 years
BW = 15 kg
ATc = 25,550 days
ATnc = 2,190 days
CSFo = 5.9E-03 (mg/kg/day)⁻¹
RfDo = NA (mg/kg/day)

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CALCULATION WORKSHEET

Page 2 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	CHECKED BY: 	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$\text{IEXc} = \frac{3.9 \text{ ug/L} \times 0.001 \text{ mg/ug} \times 1.4 \text{ L/day} \times 350 \text{ days/year} \times 6 \text{ years}}{15 \text{ kg} \times 25550 \text{ days}}$$

$$\text{IEXc} = 2.99\text{E-}05 \text{ mg/kg/day}$$

$$\text{ILCR} = 2.99\text{E-}05 \text{ mg/kg/day} \times 5.90\text{E-}03 \text{ (mg/kg/day)}^{-1} = \text{Incremental Lifetime Cancer Risk}$$

$$\text{ILCR} = 1.8\text{E-}07$$

EXAMPLE NONCARCINOGENIC CALCULATION

$$\text{IEXnc} = \frac{3.9 \text{ ug/L} \times 0.001 \text{ mg/ug} \times 1.4 \text{ L/day} \times 350 \text{ days/year} \times 6 \text{ years}}{15 \text{ kg} \times 2190 \text{ days}}$$

$$\text{IEXnc} = 3.49\text{E-}04 \text{ mg/kg/day}$$

$$\text{HQ} = \text{No reference dose is available for trichloroethene.}$$

CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	CHECKED BY: <i>L. Cefano</i>	DATE: 9/14/2012

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with groundwater at former Building 234.

EQUATION:

$$DAD = \frac{DA_{event} \times EV \times ED \times EF \times A}{BW \times AT}$$

Where:

DAD = dermally absorbed dose (mg/kg/day)
 DA_{event} = absorbed dose per event (mg/cm²/event)
 EV = event frequency (events/day)
 EF = exposure frequency (days/year)
 ED = exposure duration (years)
 A = skin surface available for contact (cm²)
 BW = body weight (kg)
 AT = averaging time (days)
 CSF_d = dermal carcinogenic slope factor ((mg/kg/day)⁻¹)
 RfD_d = dermal noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = DAD (mg/kg/day) x CSF_d (mg/kg/day)⁻¹
 HQ (Noncarcinogens) = DAD (mg/kg/day) / RfD_d (mg/kg/day)

EQUATIONS for DA_{event}:

For Inorganics:

$$DA_{event} = K_p \times C_w \times CF \times t_{event}$$

For Organics:

If $t_{event} \leq t^*$, then: $DA_{event} = 2 \times FA \times K_p \times C_w \times CF \times \sqrt{\frac{6 \times \tau \times t_{event}}{\pi}}$

If $t_{event} > t^*$, then: $DA_{event} = FA \times K_p \times C_w \times CF \times \left[\frac{t_{event}}{1+B} + 2 \times \tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$

CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	CHECKED BY: <i>L. Croft</i>	DATE: 9/14/2012

Where:

- Kp = permeability coefficient from water (cm/hr)
 Cgw = concentration of chemical in groundwater (mg/L)
 tevent = duration of event (hr/event)
 CF = conversion factor (0.001 L/cm³)
 t* = time it takes to reach steady-state (hr/event)
 τ = lag time (hr/event)
 B = Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

- Cgw = 0.0039 mg/L Chemical: Trichloroethene
 Kp = 1.16E-02 cm/hr
 FA = 1 unitless
 tevent = 1 hr/event
 CF = 0.001 L/cm³
 t* = 1.39 hr/event
 τ = 0.58 hr/event
 B = 0.051

tevent < t*, therefore,

$$DA_{event} = (2 \times 0.0116 \text{ cm/hr}) (1) (0.0039 \text{ mg/L}) (0.001 \text{ L/cm}^3) \times$$

$$\sqrt{\frac{6 \times 0.58 \text{ hr/event} \times 1 \text{ hr/event}}{\pi}}$$

$$DA_{event} = 9.52E-08 \text{ mg/cm}^2\text{-event}$$

RISK CALCULATIONS

ASSUMPTIONS:

- A = 6,600 cm²
 EV = 1 event/day
 ED = 6 years
 EF = 350 days/year
 BW = 15 kg
 ATc = 25,550 days
 ATnc = 2,190 days
 CSFd = 5.9E-03 (mg/kg/day)⁻¹
 RfDd = NA (mg/kg/day)

CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	CHECKED BY: <i>L. Croft</i>	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$\text{DADc} = \frac{9.52\text{E-}08 \text{ mg/cm}^2\text{-event} \times 1 \text{ event/day} \times 6 \text{ years} \times 350 \text{ days/year} \times 6600 \text{ cm}^2}{15 \text{ kg} \times 25550 \text{ days}}$$

$$\text{DADc} = 3.44\text{E-}06 \text{ mg/kg/day}$$

$$\text{DADc} = 3.44\text{E-}06 \text{ mg/kg/day} \times 5.90\text{E-}03 \text{ (mg/kg/day)}^{-1} = \text{Incremental Lifetime Cancer Risk}$$

$$\text{ILCR} = 2.0\text{E-}08$$

EXAMPLE NONCARCINOGENIC CALCULATION

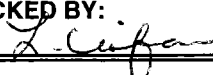
$$\text{DADnc} = \frac{9.52\text{E-}08 \text{ mg/cm}^2\text{-event} \times 1 \text{ event/day} \times 6 \text{ years} \times 350 \text{ days/year} \times 6600 \text{ cm}^2}{15 \text{ kg} \times 2190 \text{ days}}$$

$$\text{DADnc} = 4.02\text{E-}05 \text{ mg/kg/day}$$

$$\text{HQ} = \text{No reference dose is available for trichloroethene.}$$

CALCULATION WORKSHEET

Page 1 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: ESTIMATION OF AMBIENT AIR CONCENTRATIONS IN A TRENCH RESULTING FROM VOLATILE EMISSIONS FROM GROUNDWATER.		
BASED ON: VDEQ, 2004		
BY: R. JUPIN	CHECKED BY: 	DATE: 9/14/2012

PURPOSE: To calculate ambient air concentrations resulting from volatilization of TCE from groundwater at former Building 234.

$$C_{\text{trench}} = CGW \times VF$$

Where:

C_{trench} = concentration of contaminant in the trench $\mu\text{g}/\text{m}^3$
 CGW = concentration of contaminant in groundwater $\mu\text{g}/\text{L}$
 VF = volatilization factor L/m^3

1. Calculate k_iG (gas-phase mass transfer coefficient of component i)

$$k_iG = (M_{\text{H}_2\text{O}}/M_i)^{0.335} \times (T/298)^{1.005} \times kG, \text{H}_2\text{O}$$

Where:

k_iG = gas-phase mass transfer coefficient of component i cm/s
 $M_{\text{H}_2\text{O}}$ = molecular weight of water = 18 g/mol
 M_{TCE} = molecular weight of TCE = 131.39 g/mol
 $kG, \text{H}_2\text{O}$ = gas-phase mass transfer coefficient of water vapor at 25°C cm/s = 0.833 cm/s
 T = average system absolute temperature = 298
 The value of $kG, \text{H}_2\text{O}$ is 0.833 cm/s (Superfund Exposure Assessment Manual, U. S. EPA, April 1988)

$$k_iG = (18/131.39)^{0.335} \times (298/298)^{1.005} \times 0.833 \text{ cm/s} = 4.28\text{E-}01 \text{ cm/s}$$

2. Calculate k_iL (liquid-phase mass transfer coefficient of component i)

$$k_iL = (M_{\text{O}_2}/M_i)^{0.5} \times (T/298) \times kL, \text{O}_2$$

Where:

k_iL = liquid-phase mass transfer coefficient of component i cm/s
 M_{O_2} = molecular weight of O_2 = 32 g/mol
 M_{TCE} = molecular weight of TCE = 131.39 g/mol
 T = average system absolute temperature = 298
 kL, O_2 = liquid-phase mass transfer coefficient of oxygen at 25°C cm/s = 0.002 cm/s

$$k_iL = (32/131.39)^{0.5} \times (298/298) \times 0.002 \text{ cm/s} = 9.87\text{E-}04 \text{ cm/s}$$

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: ESTIMATION OF AMBIENT AIR CONCENTRATIONS IN A TRENCH RESULTING FROM VOLATILE EMISSIONS FROM GROUNDWATER.		
BASED ON: VDEQ, 2004		
BY: R. JUPIN	CHECKED BY: <i>L. Ciferri</i>	DATE: 9/14/2012

3. Calculate Ki (overall mass transfer coefficient of contaminant)

$$K_i = 1 / \{ (1/k_{iL}) + [(RT) / (H_i \times k_{iG})] \}$$

Where:

k_{iL} = liquid-phase mass transfer coefficient of i cm/s = 9.87E-04
 R = ideal gas constant atm-m³/mole-°K = 8.20E-05
 T = average system absolute temperature = 298
 H_i = Henry's Law constant of TCE (atm-m³/mol) = 9.85E-03
 k_{iG} = gas-phase mass transfer coefficient of i cm/s = 4.28E-01

$$K_i = 1 / \{ (1/9.87E-4) + [(298 \times 8.2E-5) / (9.85E-3 \times 0.428)] \} = 9.81E-04 \text{ cm/s}$$

4. Calculation of VF (Volatilization Factor)

$$VF = (K_i \times A \times F \times 10^{-3} \times 10^4 \times 3,600) / (ACH \times V)$$

Where:

VF = volatilization factor (L/m³)
 K_i = overall mass transfer coefficient of contaminant = 9.81E-04 cm/s
 A = area of the trench = 8.18 m²
 F = fraction of floor through which contaminant can enter (unitless) = 1
 ACH = air changes per hour = 360 h⁻¹
 V = volume of trench = 24.92 m³
 10^{-3} = conversion factor L/cm³ = 0.001
 10^4 = conversion factor cm²/m² = 10000
 $3,600$ = conversion factor seconds/hr = 3600

$$VF = (9.82E-4 \times 8.18 \times 1 \times 10^{-3} \times 10^4 \times 3,600) / (360 \times 24.92) = 3.22E-02 \text{ L/m}^3$$

5. Calculation of C_{trench} (concentration of contaminant in the trench)

$$C_{\text{trench}} = C_{\text{GW}} \times VF$$

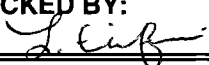
Where:

C_{trench} = concentration of contaminant in the trench (µg/m³)
 C_{GW} = concentration of TCE in groundwater = 3.9 µg/L
 VF = volatilization factor = 3.22E-02 L/m³

$$C_{\text{trench}} = 3.9 \text{ µg/L} \times 3.22E-02 \text{ L/m}^3 = 1.26E-01 \text{ µg/m}^3$$

CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES FROM GROUNDWATER - CONSTRUCTION WORKERS		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	CHECKED BY: 	DATE: 9/14/2012

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of volatiles from groundwater at former Building 234.

EQUATION:
$$EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$$

Where:

EC = exposure concentration (mg/m³)
Ca = exposure point concentration in air (mg/m³)
ET = exposure time (hrs/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
AT = averaging time (days)
IURi = inhalation unit risk ((ug/m³)⁻¹)
RfCi = inhalation reference concentration (mg/m³)

RISKS:

ILCR (Carcinogens) = Exposure Concentration (mg/m³) x IURi (ug/m³)⁻¹ x 1000 ug/mg
HQ (Noncarcinogens) = Exposure Concentration (mg/m³) / RfCi (mg/m³)

ASSUMPTIONS:

Ca = 1.26E-04 mg/m³ Chemical: Trichloroethene
ET = 8 hr/day
EF = 130 days/year
ED = 1 years
ATc = 25,550 days
ATnc = 365 days
IURi = 2.0E-06 (ug/m³)⁻¹
RfCi = 1.0E-02 mg/m³

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CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES FROM GROUNDWATER - CONSTRUCTION WORKERS		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	CHECKED BY: <i>L. Ciferri</i>	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{1.26E-04 \text{ mg/m}^3 \times 8 \text{ hr/day} \times 130 \text{ days/year} \times 1 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}}$$

$$IEXc = 2.14E-07 \text{ mg/m}^3$$

$$ILCR = 2.14E-07 \text{ mg/m}^3 \times 2.00E-06 \text{ (ug/m}^3\text{)}^{-1} \times 1000 \text{ ug/mg} = \text{Incremental Lifetime Cancer Risk}$$

$$ILCR = 4.3E-10$$

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{1.26E-04 \text{ mg/m}^3 \times 8 \text{ hr/day} \times 130 \text{ days/year} \times 1 \text{ years}}{365 \text{ days} \times 24 \text{ hours/day}}$$

$$IEXnc = 1.50E-05 \text{ mg/m}^3$$

$$HQ = 1.50E-05 \text{ mg/m}^3 / 1.00E-02 \text{ mg/m}^3 = \text{Hazard Quotient}$$

$$HQ = 1.5E-03$$

CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL FOR MUTAGENIC CHEMICALS - HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	CHECKED BY: <i>L. Cifari</i>	DATE: 9/14/2012

PURPOSE: To estimate intake and cancer risks for mutagenic chemicals from incidental ingestion of surface soil at former Building 234.

EQUATION:
$$IEX = \frac{CS \times IR \times EF \times ED \times FI \times CF}{BW \times AT} \times ADAF$$

Where:

IEX = estimated exposure intake (mg/kg/day)
Cs = exposure point concentration in soil (mg/kg)
IR = incidental ingestion rate (mg/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
FI = fraction ingested from contaminated source (unitless)
CF = conversion factor (1.0E-6 kg/mg)
BW = body weight (kg)
AT = averaging time (days)
ADAF = age-dependent adjustment factor
CSFo = oral carcinogenic slope factor ((mg/kg/day)⁻¹)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)⁻¹


ASSUMPTIONS:

Cs = 0.27 mg/kg Chemical: Benzo(a)pyrene
IR = 200 mg/day
EF = 350 days/year
ED₁ = 2 years
ED₂ = 4 years
FI = 1
CF = 1.0E-06 kg/mg
BW = 15 kg
AT = 25,550 days
CSFo = 7.3E+00 (mg/kg/day)⁻¹
ADAF₁ = 10
ADAF₂ = 3

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CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL FOR MUTAGENIC CHEMICALS - HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	CHECKED BY: 	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$IEX_1 = \frac{0.27 \text{ mg/kg} \times 200 \text{ mg/day} \times 350 \text{ days/year} \times 2 \text{ years} \times 1 \times 1.0E-06 \text{ kg/mg}}{15 \text{ kg} \times 25550 \text{ days}} \times 10$$

$$IEX_1 = 9.86E-07 \text{ mg/kg/day}$$

$$IEX_2 = \frac{0.27 \text{ mg/kg} \times 200 \text{ mg/day} \times 350 \text{ days/year} \times 4 \text{ years} \times 1 \times 1.0E-06 \text{ kg/mg}}{15 \text{ kg} \times 25550 \text{ days}} \times 3$$


$$IEX_2 = 5.92E-07 \text{ mg/kg/day}$$

$$ILCR = (9.86E-07 \text{ mg/kg/day} + 5.92E-07 \text{ mg/kg/day}) \times 7.30E+00 \text{ (mg/kg/day)}^{-1}$$

$$ILCR = 1.2E-05$$

CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL FOR MUTAGENIC CHEMICALS HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	CHECKED BY: 	DATE: 9/14/2012

PURPOSE: To estimate intake and cancer risks for mutagenic chemicals from dermal contact with surface soil at former Building 234.

EQUATION:
$$DEX = \frac{Cs \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT} \times ADAF$$

Where:

DEX = estimated exposure intake (mg/kg/day)
 Cs = exposure point concentration in soil (mg/kg)
 CF = conversion factor (1.0E-6 kg/mg)
 SA = skin surface available for contact (cm²/day)
 ABS = absorption factor (unitless)
 AF = adherence factor (mg/cm²)
 EF = exposure frequency (days/year)
 ED = exposure duration (years)
 BW = body weight (kg)
 AT = averaging time (days)
 ADAF = age-dependent adjustment factor
 CSFd = dermal carcinogenic slope factor ((mg/kg/day)⁻¹)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFd (mg/kg/day)⁻¹

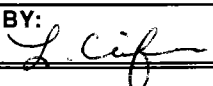
ASSUMPTIONS:

Cs = 0.27 mg/kg Chemical: Benzo(a)pyrene
 CF = 1.0E-06 kg/mg
 SA = 2,800 cm²/day
 AF = 0.2 mg/cm²
 ABS = 0.13
 EF = 350 days/year
 ED₁ = 2 years
 ED₂ = 4 years
 BW = 15 kg
 AT = 25,550 days
 CSFd = 7.3E+00 (mg/kg/day)⁻¹
 ADAF₁ = 10
 ADAF₂ = 3

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CALCULATION WORKSHEET

Page 2 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL FOR MUTAGENIC CHEMICALS HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	CHECKED BY: 	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$\text{DEXc} = \frac{0.27 \text{ mg/kg} \times 1.0\text{E-}06 \text{ kg/mg} \times 2800 \text{ cm}^2/\text{day} \times 0.2 \text{ mg/cm}^2 \times 0.13 \times 350 \text{ days/year} \times 2 \text{ years}}{15 \text{ kg} \times 25550 \text{ days}} \times 10$$

$$\text{DEXc} = 3.59\text{E-}07 \text{ mg/kg/day}$$

$$\text{DEXc} = \frac{0.27 \text{ mg/kg} \times 1.0\text{E-}06 \text{ kg/mg} \times 2800 \text{ cm}^2/\text{day} \times 0.2 \text{ mg/cm}^2 \times 0.13 \times 350 \text{ days/year} \times 4 \text{ years}}{15 \text{ kg} \times 25550 \text{ days}} \times 3$$

$$\text{DEXc} = 2.15\text{E-}07 \text{ mg/kg/day}$$

$$\text{ILCR} = (3.59\text{E-}07 \text{ mg/kg/day} + 2.15\text{E-}07 \text{ mg/kg/day}) \times 7.30\text{E+}00 (\text{mg/kg/day})^{-1}$$

$$\text{ILCR} = 4.2\text{E-}06$$

CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS FOR MUTAGENIC CHEMICALS - HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	CHECKED BY: <i>L. Ciofani</i>	DATE: 9/14/2012

PURPOSE: To estimate intake, carcinogenic risks for mutagenic chemicals from inhalation of surface soil at former Building 234.

EQUATION:
$$EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}} \times ADAF$$

Where:

EC = estimated exposure concentration (mg/m³)
Ca = exposure point concentration in air (mg/m³)
= Cs x 1/PEF
Cs = exposure point concentration in soil (mg/kg)
PEF = particulate emission factor (m³/kg)
ET = exposure time (hrs/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
AT = averaging time (hours)
ADAF = age-dependent adjustment factor
IUR = inhalation unit risk((ug/mg)⁻¹)

RISKS:

ILCR = Exposure concentration (mg/m³) x IURi (ug/m³)-1 x 1000 ug/mg

ASSUMPTIONS:

Cs = 0.27 mg/kg Chemical: Benzo(a)pyrene
PEF = 1.10E+10 m³/kg
Ca = 2.45E-11 mg/m³
ET = 24 hr/day
EF = 350 days/year
ED₁ = 2 years
ED₂ = 4 years
ATc = 25,550 days
IUR = 1.1E-03 (ug/m³)⁻¹
ADAF₁ = 10
ADAF₂ = 3

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CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS FOR MUTAGENIC CHEMICALS - HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	CHECKED BY: <i>L. Cifer</i>	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$EC = \frac{2.45E-11 \text{ mg/m}^3 \times 24 \text{ hr/day} \times 350 \text{ days/year} \times 2 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}} \times 10$$

$$EC = 6.72E-12 \text{ mg/m}^3$$

$$EC = \frac{2.45E-11 \text{ mg/m}^3 \times 24 \text{ hr/day} \times 350 \text{ days/year} \times 4 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}} \times 3$$

$$EC = 4.03E-12 \text{ mg/m}^3$$

$$ILCR = (6.72E-12 \text{ mg/m}^3 + 4.03E-12 \text{ mg/m}^3) \times 1.10E-03 (\text{ug/m}^3)^{-1} \times 1000 \text{ ug/mg}$$

$$ILCR = 1.2E-11$$

CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL FOR MUTAGENIC CHEMICALS - HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	CHECKED BY: <i>L. Carfagna</i>	DATE: 9/14/2012

PURPOSE: To estimate intake and cancer risks for mutagenic chemicals from incidental ingestion of surface soil at former Building 234.

EQUATION:
$$IEX = \frac{CS \times IR \times EF \times ED \times FI \times CF}{BW \times AT} \times ADAF$$

Where:

IEX = estimated exposure intake (mg/kg/day)
Cs = exposure point concentration in soil (mg/kg)
IR = incidental ingestion rate (mg/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
FI = fraction ingested from contaminated source (unitless)
CF = conversion factor (1.0E-6 kg/mg)
BW = body weight (kg)
AT = averaging time (days)
ADAF = age-dependent adjustment factor
CSFo = oral carcinogenic slope factor ((mg/kg/day)⁻¹)

RISKS:

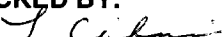
ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)⁻¹

ASSUMPTIONS:

Cs = 0.27 mg/kg Chemical: Benzo(a)pyrene
IR = 100 mg/day
EF = 350 days/year
ED₁ = 10 years
ED₂ = 14 years
FI = 1
CF = 1.0E-06 kg/mg
BW = 70 kg
AT = 25,550 days
CSFo = 7.3E+00 (mg/kg/day)⁻¹
ADAF₁ = 3
ADAF₂ = 1

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL FOR MUTAGENIC CHEMICALS - HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	CHECKED BY: 	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$IEX_1 = \frac{0.27 \text{ mg/kg} \times 100 \text{ mg/day} \times 350 \text{ days/year} \times 10 \text{ years} \times 1 \times 1.0E-06 \text{ kg/mg}}{70 \text{ kg} \times 25550 \text{ days}} \times 3$$

$IEX_1 = 1.59E-07 \text{ mg/kg/day}$

$$IEX_2 = \frac{0.27 \text{ mg/kg} \times 100 \text{ mg/day} \times 350 \text{ days/year} \times 14 \text{ years} \times 1 \times 1.0E-06 \text{ kg/mg}}{70 \text{ kg} \times 25550 \text{ days}} \times 1$$

$$IEX_2 = 7.40E-08 \text{ mg/kg/day}$$

$$\text{ILCR} = (1.59\text{E-}07 \text{ mg/kg/day} + 7.40\text{E-}08 \text{ mg/kg/day}) \times 7.30\text{E+}00 (\text{mg/kg/day})^{-1}$$

ILCR = 1.7E-06

CALCULATION WORKSHEET

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CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL FOR MUTAGENIC CHEMICALS HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	CHECKED BY: <i>L. Cuffey</i>	DATE: 9/14/2012

PURPOSE: To estimate intake and cancer risks for mutagenic chemicals from dermal contact with surface soil at former Building 234.

EQUATION:
$$DEX = \frac{Cs \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT} \times ADAF$$

Where:

- DEX = estimated exposure intake (mg/kg/day)
- Cs = exposure point concentration in soil (mg/kg)
- CF = conversion factor (1.0E-6 kg/mg)
- SA = skin surface available for contact (cm²/day)
- ABS = absorption factor (unitless)
- AF = adherence factor (mg/cm²)
- EF = exposure frequency (days/year)
- ED = exposure duration (years)
- BW = body weight (kg)
- AT = averaging time (days)
- ADAF = age-dependent adjustment factor
- CSFd = dermal carcinogenic slope factor ((mg/kg/day)⁻¹)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFd (mg/kg/day)⁻¹

ASSUMPTIONS:

- Cs = 0.27 mg/kg Chemical: Benzo(a)pyrene
- CF = 1.0E-06 kg/mg
- SA = 5,700 cm²/day
- AF = 0.07 mg/cm²
- ABS = 0.13
- EF = 350 days/year
- ED₁ = 10 years
- ED₂ = 14 years
- BW = 70 kg
- AT = 25,550 days
- CSFd = 7.3E+00 (mg/kg/day)⁻¹
- ADAF₁ = 3
- ADAF₂ = 1

CALCULATION WORKSHEET

Page 2 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL FOR MUTAGENIC CHEMICALS HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	CHECKED BY: <i>L. Ciferri</i>	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$\text{DEXc} = \frac{0.27 \text{ mg/kg} \times 1.0\text{E-}06 \text{ kg/mg} \times 5700 \text{ cm}^2/\text{day} \times 0.07 \text{ mg/cm}^2 \times 0.13 \times 350 \text{ days/year} \times 10 \text{ years}}{70 \text{ kg} \times 25550 \text{ days}} \times 3$$

$$\text{DEXc} = 8.22\text{E-}08 \text{ mg/kg/day}$$

$$\text{DEXc} = \frac{0.27 \text{ mg/kg} \times 1.0\text{E-}06 \text{ kg/mg} \times 5700 \text{ cm}^2/\text{day} \times 0.07 \text{ mg/cm}^2 \times 0.13 \times 350 \text{ days/year} \times 14 \text{ years}}{70 \text{ kg} \times 25550 \text{ days}} \times 1$$

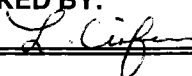
$$\text{DEXc} = 3.84\text{E-}08 \text{ mg/kg/day}$$

$$\text{ILCR} = (8.22\text{E-}08 \text{ mg/kg/day} + 3.84\text{E-}08 \text{ mg/kg/day}) \times 7.30\text{E+}00 \text{ (mg/kg/day)}^{-1}$$

$$\text{ILCR} = 8.8\text{E-}07$$

CALCULATION WORKSHEET

Page 1 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS FOR MUTAGENIC CHEMICALS - HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	CHECKED BY: 	DATE: 9/14/2012

PURPOSE: To estimate intake, carcinogenic risks for mutagenic chemicals from inhalation of surface soil at former Building 234.

EQUATION:
$$EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}} \times ADAF$$

Where:

EC = estimated exposure intake (mg/kg/day)
Ca = exposure point concentration in air (mg/m³)
= Cs x 1/PEF
Cs = exposure point concentration in soil (mg/kg)
PEF = particulate emission factor (m³/kg)
IR = inhalation rate (m³/hr)
ET = exposure time (hrs/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time (hours)
ADAF = age-dependent adjustment factor
IURi = inhalation unit risk((ug/mg)⁻¹)

RISKS:

ILCR = Exposure concentration (mg/m³) x IUR (ug/m³)-1 x 1000 ug/mg

ASSUMPTIONS:

Cs = 0.27 mg/kg Chemical: Benzo(a)pyrene
PEF = 1.10E+10 m³/kg
Ca = 2.45E-11 mg/m³
ET = 24 hr/day
EF = 350 days/year
ED₁ = 10 years
ED₂ = 14 years
ATc = 25,550 days
IUR = 1.1E-03 (ug/m³)⁻¹
ADAF₁ = 3
ADAF₂ = 1

9/17/2012

CALCULATION WORKSHEET

Page 2 of 2

CLIENT: NAVSTA NEWPORT, NEWPORT, RHODE ISLAND		JOB NUMBER: 112G02747
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS FOR MUTAGENIC CHEMICALS - HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	CHECKED BY: <i>L. Ciferri</i>	DATE: 9/14/2012

EXAMPLE CARCINOGENIC CALCULATION

$$EC = \frac{2.45E-11 \text{ mg/m}^3 \times 24 \text{ hr/day} \times 350 \text{ days/year} \times 10 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}} \times 3$$

$$EC = 1.01E-11 \text{ mg/m}^3$$

$$EC = \frac{2.45E-11 \text{ mg/m}^3 \times 24 \text{ hr/day} \times 350 \text{ days/year} \times 14 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}} \times 1$$

$$EC = 4.71E-12 \text{ mg/m}^3$$

$$ILCR = (1.01E-11 \text{ mg/m}^3 + 4.71E-12 \text{ mg/m}^3) \times 1.10E-03 \text{ (ug/m}^3\text{)}^{-1} \times 1000 \text{ ug/mg}$$

$$ILCR = 1.6E-11$$

APPENDIX F.5

SCREENING RISK EVALUATION FOR VAPOR INTRUSION

SCREENING RISK EVALUATION FOR VAPOR INTRUSION
VISL CALCULATIONS – NORTH WATERFRONT GROUNDWATER

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Cgw (ug/L)	Cia (ug/m ³)	CR	HQ
156-59-2	Dichloroethylene, 1,2-cis-	4.3E+00	5.71E-01	No IUR	No RfC
156-60-5	Dichloroethylene, 1,2-trans-	4.8E+00	6.53E-01	No IUR	1.0E-02
x 127-18-4	Tetrachloroethylene	7.0E-01	3.83E-01	4.1E-08	9.2E-03
x 79-01-6	Trichloroethylene	3.3E+01	1.04E+01	2.4E-05	5.0E+00
x 75-01-4	Vinyl Chloride	1.5E+00	1.45E+00	9.0E-06	1.4E-02

Symbol

See the Navigation Guide equation for Cia,c for vinyl chloride.

Inhalation Unit Risk	IUR Source*	Reference Concentration	RfC Source*	Mutagenic Indicator
IUR		RfC		I
(ug/m ³) ⁻¹		(mg/m ³)		
		6.00E-02	P	
2.60E-07	I	4.00E-02	I	
see note	I	2.00E-03	I	TCE
4.40E-06	I	1.00E-01	I	VC

Value

Symbol

Value

Symbol

Value

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? Cvp > C _{ia} L _{amp} /AFss?	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? Cvp > C _{ia} L _{target} /AF _{FW}	Target Indoor Air Conc. @ TCR = 1E-06 or THQ = 1 MIN(C _{ia} c,C _{ia} nc)	Toxicity Basis	Target Sub-Slab and Exterior Soil Gas Conc. @ TCR = 1E-06 or THQ = 1 C _{sg}	Target Ground Water Conc. @ TOR = 1E-06 or THQ = 1 C _{gw}	Is Target Ground Water Conc. < MCL? C _{gw} <MCL?	Temperature for Groundwater Vapor Conc. T _{gw} or 25	Lower Explosive Limit** LEL	LEL Source	Inhalation Unit Risk IUR	IUR Source*	Reference Concentration RfC	RfC Source*	Mutagenic Indicator I	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06 C _{ia} c	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 1 C _{ia} nc
		Yes/No	Yes/No	(ug/m ³)	C/N/C	(ug/m ³)	(ug/L)	(MCL ug/L)	C	(% by vol)		(ug/m ³) ¹		(mg/m ³)			(ug/m ³)	(ug/m ³)
x 540-59-0	Dichloroethylene, 1,2- (Mixed isomers)	No Inhal. Tox. Info	No Inhal. Tox. Info	--	--	--	--	--	20									
x 156-59-2	Dichloroethylene, 1,2-cis-	No Inhal. Tox. Info	No Inhal. Tox. Info	--	--	--	--	No (70)	20	9.7	M							
x 156-60-5	Dichloroethylene, 1,2-trans-	Yes	Yes	6.3E+01	NC	6.3E+02	4.6E+02	No (100)	20	9.7	M			6.00E-02	P			6.3E+01
x 127-18-4	Tetrachloroethylene	Yes	Yes	9.4E+00	C	9.4E+01	1.7E+01	No (5)	20			2.60E-07	I	4.00E-02	I		9.4E+00	4.2E+01
x 79-01-6	Trichloroethylene	Yes	Yes	4.3E-01	C	4.3E+00	1.4E+00	Yes (6)	20	8	N	see note	I	2.00E-03	I	TCE	4.3E-01	2.1E+00
x 75-01-4	Vinyl Chloride	Yes	Yes	1.6E-01	C	1.6E+00	1.6E-01	Yes (2)	20	3.6	N	4.40E-06	I	1.00E-01	I	VC	1.6E-01	1.0E+02
x	Trichloroethylene				Symbol	Value	Symbol	Value	Symbol	Value								
x	Vinyl Chloride																	

See the Navigation Guide equation for C_{ia}c for vinyl chloride.

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m³)	VI Carcinogenic Risk CR	VI Hazard HQ
156-59-2	Dichloroethylene, 1,2-cis-	4.3E+00	5.71E-01	No IUR	No RfC
156-60-5	Dichloroethylene, 1,2-trans-	4.8E+00	6.53E-01	No IUR	2.5E-03
x 127-18-4	Tetrachloroethylene	7.0E-01	3.83E-01	8.1E-09	2.2E-03
x 79-01-6	Trichloroethylene	3.3E+01	1.04E+01	3.5E-06	1.2E+00
x 75-01-4	Vinyl Chloride	1.5E+00	1.45E+00	5.2E-07	3.3E-03
x	Trichloroethylene				
x	Vinyl Chloride				

See the Navigation Guide equation for Cia,c for vinyl chloride.

Inhalation Unit Risk IUR (ug/m³)⁻¹	IUR Source*	Reference Concentration RfC (mg/m³)	RfC Source*	Mutagenic Indicator
2.60E-07	I	6.00E-02	P	
see note	I	4.00E-02	I	TCE
4.40E-06	I	2.00E-03	I	VC
		1.00E-01	I	

Value

Symbol

Value

Symbol

Value

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

		Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? Cvp > C _{ia,target} /AFss?	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? Cvp > C _{ia,target} /AFgw?	Target Indoor Air Conc. @ TCR = 1E-06 or THQ = 1 MIN(C _{ia,c} ,C _{ia,nc})	Toxicity Basis	Target Sub-Slab and Exterior Soil Gas Conc. @ TCR = 1E-06 or THQ = 1 C _{sg}	Target Ground Water Conc. @ TCR = 1E-06 or THQ = 1 C _{gw}	Is Target Ground Water Conc. < MCL? C _{gw} <MCL?	Temperature for Groundwater Vapor Conc. T _{gw} or 25	Lower Explosive Limit** LEL	LEL Source
CAS	Chemical Name	Yes/No	Yes/No	(ug/m ³)	C/NC	(ug/m ³)	(ug/L)	Yes/No (MCL ug/L)	C	(% by vol)	
x 540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	No Inhal. Tox. Info	No Inhal. Tox. Info	--	--	--	--	--	20		
x 156-59-2	Dichloroethylene, 1,2-cis-	No Inhal. Tox. Info	No Inhal. Tox. Info	--	--	--	--	No (70)	20	9.7	M
x 156-60-5	Dichloroethylene, 1,2-trans-	Yes	Yes	2.6E+02	NC	2.6E+03	1.9E+03	No (100)	20	9.7	M
x 127-18-4	Tetrachloroethylene	Yes	Yes	4.7E+01	C	4.7E+02	8.6E+01	No (5)	20		
x 79-01-6	Trichloroethylene	Yes	Yes	3.0E+00	C	3.0E+01	9.5E+00	No (5)	20	8	N
x 75-01-4	Vinyl Chloride	Yes	Yes	2.8E+00	C	2.8E+01	2.8E+00	No (2)	20	3.6	N
x	Trichloroethylene				Symbol	Value	Symbol	Value	Symbol	Value	
x	Vinyl Chloride										

See the Navigation Guide equation for C_{ia,c} for vinyl chloride.

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06 C _{ia,c}	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 1 C _{ia,nc}
(ug/m ³) ⁻¹		(mg/m ³)		I	(ug/m ³)	(ug/m ³)
		6.00E-02	P			2.6E+02
2.60E-07	I	4.00E-02	I		4.7E+01	1.8E+02
see note	I	2.00E-03	I	TCE	3.0E+00	8.8E+00
4.40E-06	I	1.00E-01	I	VC	2.8E+00	4.4E+02

SCREENING RISK EVALUATION FOR VAPOR INTRUSION

VISL CALCULATIONS – NORTH WATERFRONT SOIL GAS

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Csg (ug/m ³)	Cia (ug/m ³)	CR	HQ
107-13-1	Acrylonitrile	2.8E+00	2.80E-01	7.8E-06	1.3E-01
x 71-43-2	Benzene	6.7E-01	6.70E-02	2.1E-07	2.1E-03
106-99-0	Butadiene, 1,3-	1.3E+01	1.30E+00	1.6E-05	6.2E-01
x 75-34-3	Dichloroethane, 1,1-	2.5E-01	2.50E-02	1.6E-08	No RfC
x 540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	3.1E+01	3.11E+00	No IUR	No RfC
156-59-2	Dichloroethylene, 1,2-cis-	2.7E+01	2.70E+00	No IUR	No RfC
156-60-5	Dichloroethylene, 1,2-trans-	4.1E+00	4.10E-01	No IUR	6.6E-03
x 127-18-4	Tetrachloroethylene	1.2E+01	1.20E+00	1.3E-07	2.9E-02
x 71-55-6	Trichloroethane, 1,1,1-	2.6E-01	2.60E-02	No IUR	5.0E-06
x 79-01-6	Trichloroethylene	1.2E+02	1.20E+01	2.8E-05	5.8E+00
x 75-01-4	Vinyl Chloride	7.6E-01	7.60E-02	4.7E-07	7.3E-04
x	Trichloroethylene			Symbol	
x	Vinyl Chloride				

See the Navigation Guide equation for Cia,c for vinyl chloride.

Value

Inhalation Unit Risk	IUR Source*	Reference Concentration	RfC Source*	Mutagenic Indicator
IUR		RfC		I
(ug/m ³) ⁻¹		(mg/m ³)		
6.80E-05	I	2.00E-03	I	
7.80E-06	I	3.00E-02	I	
3.00E-05	I	2.00E-03	I	
1.60E-06	CA			
		6.00E-02	P	
2.60E-07	I	4.00E-02	I	
		5.00E+00	I	
see note	I	2.00E-03	I	TCE
4.40E-06	I	1.00E-01	I	VC

Symbol

Value

Symbol

Value

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source?	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source?	Target Indoor Air Conc. @ TCR = 1E-06 or THQ = 1	Toxicity Baseline	Target Sub-Slab and Exterior Soil Gas Conc. @ TCR = 1E-06 or THQ = 1	Target Ground Water Conc. @ TCR = 1E-06 or THQ = 1	Is Target Ground Water Conc. < MCL?	Temperature for Groundwater Vapor Conc.	Lower Explosive Limit*	LEL Source
		Cvp > C _{ia,target} /AF _{ss} ?	Cvp > C _{ia,target} /AF _{gw} ?	MIN(C _{ia,c} , C _{ia,nc})	C/N/C	C _{sg}	C _{gw}	C _{gw} <MCL?	T _{gw} or 25	LEL	
		Yes/No	Yes/No	(ug/m ³)		(ug/m ³)	(ug/L)	Yes/No (MCL ug/L)	C	(% by vol)	
107-13-1	Acrylonitrile	Yes	Yes	3.6E-02	C	3.6E-01	8.2E+00	--	20	3	N
x 71-43-2	Benzene	Yes	Yes	3.1E-01	C	3.1E+00	1.7E+00	Yes (5)	20	1.2	N
106-99-0	Butadiene, 1,3	Yes	Yes	8.1E-02	C	8.1E-01	3.1E-02	--	20	2	N
x 75-34-3	Dichloroethane, 1,1-	Yes	Yes	1.5E+00	C	1.5E+01	8.2E+00	--	20	5.4	N
x 75-35-4	Dichloroethylene, 1,1-	Yes	Yes	2.1E+02	NC	2.1E+03	2.3E+02	No (7)	20	6.5	N
x 540-59-0	Dichloroethylene, 1,2- (Mixed isomers)	No Inhal. Tox. Info	No Inhal. Tox. Info	--	--	--	--	--	20	--	
156-59-2	Dichloroethylene, 1,2-cis-	No Inhal. Tox. Info	No Inhal. Tox. Info	--	--	--	--	No (70)	20	9.7	M
156-60-5	Dichloroethylene, 1,2-trans-	Yes	Yes	6.3E+01	NC	6.3E+02	4.6E+02	No (100)	20	9.7	M
x 127-18-4	Tetrachloroethylene	Yes	Yes	9.4E+00	C	9.4E+01	1.7E+01	No (5)	20	--	
x 71-55-6	Trichloroethane, 1,1,1-	Yes	Yes	5.2E+03	NC	5.2E+04	9.3E+03	No (200)	20	7.5	N
x 79-01-6	Trichloroethylene	Yes	Yes	4.3E-01	C	4.3E+00	1.4E+00	Yes (5)	20	8	N
x 75-01-4	Vinyl Chloride	Yes	Yes	1.6E-01	C	1.6E+00	1.6E-01	Yes (2)	20	3.6	N
x	Trichloroethylene				Symbol	Value	Symbol	Value	Symbol	Value	
x	Vinyl Chloride										

See the Navigation Guide equation for C_{ia,c} for vinyl chloride.

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 1
					C _{ia,c}	C _{ia,nc}
(ug/m ³) ⁻¹		(mg/m ³)			(ug/m ³)	(ug/m ³)
6.80E-05	I	2.00E-03	I		3.6E-02	2.1E+00
7.80E-06	I	3.00E-02	I		3.1E-01	3.1E+01
3.00E-05	I	2.00E-03	I		8.1E-02	2.1E+00
1.80E-06	CA				1.5E+00	
		2.00E-01	I			2.1E+02
		6.00E-02	P			6.3E+01
2.80E-07	I	4.00E-02	I		9.4E+00	4.2E+01
		5.00E+00	I			5.2E+03
see note	I	2.00E-03	I	TCE	4.3E-01	2.1E+00
4.40E-06	I	1.00E-01	I	VC	1.6E-01	1.0E+02

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Csg (ug/m ³)	Cia (ug/m ³)	CR	HQ
107-13-1	Acrylonitrile	2.8E+00	2.80E-01	1.6E-06	3.2E-02
x 71-43-2	Benzene	6.7E-01	6.70E-02	4.3E-08	5.1E-04
106-99-0	Butadiene, 1,3-	1.3E+01	1.30E+00	3.2E-06	1.5E-01
x 75-34-3	Dichloroethane, 1,1-	2.5E-01	2.50E-02	3.3E-09	No RfC
x 540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	3.1E+01	3.11E+00	No IUR	No RfC
156-59-2	Dichloroethylene, 1,2-cis-	2.7E+01	2.70E+00	No IUR	No RfC
156-60-5	Dichloroethylene, 1,2-trans-	4.1E+00	4.10E-01	No IUR	1.6E-03
x 127-18-4	Tetrachloroethylene	1.2E+01	1.20E+00	2.5E-08	6.8E-03
x 71-55-6	Trichloroethane, 1,1,1-	2.6E-01	2.60E-02	No IUR	1.2E-06
x 79-01-6	Trichloroethylene	1.2E+02	1.20E+01	4.0E-06	1.4E+00
x 75-01-4	Vinyl Chloride	7.6E-01	7.60E-02	2.7E-08	1.7E-04
x	Trichloroethylene				Symbol
x	Vinyl Chloride				Value

See the Navigation Guide equation for Cia,c for vinyl chloride.

Inhalation Unit Risk	IUR Source*	Reference Concentration	RfC Source*	Mutagenic Indicator
IUR (ug/m ³) ⁻¹		RfC (mg/m ³)		I
6.80E-05	I	2.00E-03	I	
7.80E-06	I	3.00E-02	I	
3.00E-05	I	2.00E-03	I	
1.60E-06	CA			
		6.00E-02	P	
2.60E-07	I	4.00E-02	I	
		5.00E+00	I	
see note	I	2.00E-03	I	TCE
4.40E-06	I	1.00E-01	I	VC

Value

Symbol

Value

Symbol

Value

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source?	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source?	Target Indoor Air Conc. @ TCR = 1E-06 or THQ = 1	Toxicity Basis	Target Sub-Slab and Exterior Soil Gas Conc. @ TCR = 1E-06 or THQ = 1	Target Ground Water Conc. @ TCR = 1E-06 or THQ = 1	Is Target Groundwater Conc. < MCL?	Temperature for Groundwater Vapor Conc.	Lower Explosive Limit**	LEL Source	Inhalation Unit Risk	IUR Source*	Reference Concentration	RfC Source*	Mutagenic Indicator	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 1
		Cvp > Cia,target/AFs?	Cvp > Cia,target/AFgw?	MIN(Cia,c,Cia,nc)	Csg	Cgw	Cgw<MCL?	Tgw or 25	LEL			IUR	RfC				Cia,c	Cia,nc
		Yes/No	Yes/No	(ug/m ³)	C/NC	(ug/m ³)	(ug/L)	(MCL ug/L)	C	(% by vol)	(ug/m ³) ¹	(mg/m ³)		(ug/m ³)	(ug/m ³)			
107-13-1	Acrylonitrile	Yes/No	Yes/No	1.8E+01	C	1.8E+00	4.1E+01	--	20	3	N	6.80E-06	I	2.00E-03	I		1.8E-01	8.8E+00
71-43-2	Benzene	Yes	Yes	1.6E+00	C	1.6E+01	8.7E+00	No (5)	20	1.2	N	7.80E-06	I	3.00E-02	I		1.6E+00	1.3E+02
106-99-0	Butadiene, 1,3-	Yes	Yes	4.1E-01	C	4.1E+00	1.6E-01	--	20	2	N	3.00E-05	I	2.00E-03	I		4.1E-01	8.8E+00
75-34-3	Dichloroethane, 1,1-	Yes	Yes	7.7E+00	C	7.7E+01	4.1E+01	--	20	5.4	N	1.60E-06	CA		I		7.7E+00	
75-35-4	Dichloroethylene, 1,1-	Yes	Yes	8.8E+02	NC	8.8E+03	9.9E+02	No (7)	20	6.5	N			2.00E-01	I			8.8E+02
540-59-0	Dichloroethylene, 1,2- (Mixed isomers)	No Inhal. Tox. Info	No Inhal. Tox. Info	--	--	--	--	--	20									
156-59-2	Dichloroethylene, 1,2-cis-	No Inhal. Tox. Info	No Inhal. Tox. Info	--	--	--	No (70)	--	20	9.7	M							
156-60-5	Dichloroethylene, 1,2-trans-	Yes	Yes	2.6E+02	NC	2.6E+03	1.9E+03	No (100)	20	9.7	M			6.00E-02	P			2.6E+02
127-18-4	Tetrachloroethylene	Yes	Yes	4.7E+01	C	4.7E+02	8.6E+01	No (5)	20			2.60E-07	I	4.00E-02	I		4.7E+01	1.8E+02
71-55-6	Trichloroethane, 1,1,1-	Yes	Yes	2.2E+04	NC	2.2E+05	3.9E+04	No (200)	20	7.5	N			5.00E+00	I			2.2E+04
79-01-6	Trichloroethylene	Yes	Yes	3.0E+00	C	3.0E+01	9.5E+00	No (5)	20	8	N	see note	I	2.00E-03	I	TCE	3.0E+00	8.8E+00
75-01-4	Vinyl Chloride	Yes	Yes	2.8E+00	C	2.8E+01	2.8E+00	No (2)	20	3.6	N	4.40E-06	I	1.00E-01	I	VC	2.8E+00	4.4E+02
	Trichloroethylene				Symbol	Value	Symbol	Value	Symbol	Value								
	Vinyl Chloride	See the Navigation Guide equation for Cia,c for vinyl chloride.																

See the Navigation Guide equation for Cia,c for vinyl chloride.

SCREENING RISK EVALUATION FOR VAPOR INTRUSION

VISL CALCULATIONS – FORMER BUILDING 234 GROUNDWATER

SEWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Cgw (ug/L)	Cia (ug/m ³)	CR	HQ
x 75-35-4	Dichloroethylene, 1,1-	2.5E-01	2.22E-01	No IUR	1.1E-03
x 156-59-2	Dichloroethylene, 1,2-cis-	1.3E+01	1.70E+00	No IUR	No RfC
x 79-01-6	Trichloroethylene	4.0E+00	1.26E+00	2.9E-06	6.1E-01
x 75-01-4	Vinyl Chloride	1.0E+02	9.87E+01	6.1E-04	9.5E-01

x Trichloroethylene
x Vinyl Chloride
See the Navigation Guide equation for Cia,c for vinyl chloride.

Inhalation Unit Risk	IUR Source*	Reference Concentration	RfC Source*	Mutagenic Indicator
IUR (ug/m ³) ⁻¹		RfC (mg/m ³)		I
		2.00E-01	I	
see note	I	2.00E-03	I	TCE
4.40E-06	I	1.00E-01	I	VC

Value Symbol Value Symbol Value

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source?	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source?	Target Indoor Air Conc. @ TCR = 1E-06 or THQ = 1	Toxicity Basis	Target Sub-Slab and Exterior Soil Gas Conc. @ TCR = 1E-06 or THQ = 1	Target Ground Water Conc. @ TCR = 1E-06 or THQ = 1	Is Target Ground Water Conc. < MCL?	Temperature for Groundwater Vapor Conc.	Lower Explosive Limit*	REL Source
			Cvp > Cia,target/AFss?	Cvp > Cia,target/AFgw?	MIN(Cia,c,Cia,g)	C/N/C	Csq	Cgw	Cgw<MCL?	Tgw or 25	LEL	
			Yes/No	Yes/No	(ug/m ³)	C/N/C	(ug/m ³)	(ug/L)	(MCL ug/L)	C	(% by vol)	
x	75-35-4	Dichloroethylene, 1,1-	Yes	Yes	2.1E+02	NC	2.1E+03	2.3E+02	No (7)	20	6.5	N
	156-59-2	Dichloroethylene, 1,2-cis-	No Inhal. Tox. Info	No Inhal. Tox. Info	--	--	--	--	No (70)	20	9.7	M
x	79-01-6	Trichloroethylene	Yes	Yes	4.3E-01	C	4.3E+00	1.4E+00	Yes (5)	20	9	N
x	75-01-4	Vinyl Chloride	Yes	Yes	1.6E-01	C	1.6E+00	1.6E-01	Yes (2)	20	3.6	N
x		Trichloroethylene										
x		Vinyl Chloride										

See the Navigation Guide equation for Cia,c for vinyl chloride.

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 1
(ug/m ³) ⁻¹		(mg/m ³)		I	Cia,c	Cia,nc
		(mg/m ³)			(ug/m ³)	(ug/m ³)
		2.00E-01	I			2.1E+02
see note	I	2.00E-03	I	TCE	4.3E-01	2.1E+00
4.40E-06	I	1.00E-01	I	VC	1.6E-01	1.0E+02

OSWEP VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

		Site Groundwater Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Cgw	Cia	CR	HQ
CAS	Chemical Name	(ug/L)	(ug/m ³)		
x 75-35-4	Dichloroethylene, 1,1-	2.5E-01	2.22E-01	No IUR	2.5E-04
156-59-2	Dichloroethylene, 1,2-cis-	1.3E+01	1.70E+00	No IUR	No RIC
x 79-01-6	Trichloroethylene	4.0E+00	1.26E+00	4.2E-07	1.4E-01
x 75-01-4	Vinyl Chloride	1.0E+02	9.87E+01	3.5E-05	2.3E-01

x Trichloroethylene
x Vinyl Chloride
See the Navigation Guide equation for Cia,c for vinyl chloride.

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
IUR		RIC		I
(ug/m ³) ⁻¹		(mg/m ³)		
		2.00E-01	I	
see note	I	2.00E-03	I	TCE
4.40E-06	I	1.00E-01	I	VC

Value Symbol Value Symbol Value

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	20	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source?	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source?	Target Indoor Air Conc. @ TCR = 1E-06 or THQ = 1	Toxicity Basis	Target Sub-Slab and Exterior Soil Gas Conc. @ TCR = 1E-06 or THQ = 1	Target Ground Water Conc. @ TCR = 1E-06 or THQ = 1	Is Target Ground Water Conc. < MCL?	Temperature for Groundwater Vapor Conc.	Lower Explosive Limit**	REL Source
		Cvp > Cia,target/AFss?	Cvp > Cia,target/AFgw?	MIN(Cia,c,Cia,nc)		Csg	Cgw	Cgw<MCL?	Tgw or 25	LEL	
		Yes/No	Yes/No	(ug/m ³)	C/NC	(ug/m ³)	(ug/L)	Yes/No (MCL ug/L)	C	(% by vol)	
x 75-35-4	Dichloroethylene, 1,1-	Yes	Yes	8.8E+02	NC	8.8E+03	9.9E+02	No (7)	20	6.5	N
x 156-59-2	Dichloroethylene, 1,2-dis-	No Inhal. Tox. Info	No Inhal. Tox. Info	--	--	--	--	No (70)	20	9.7	M
x 79-01-6	Trichloroethylene	Yes	Yes	3.0E+00	C	3.0E+01	9.9E+00	No (5)	20	8	N
x 75-01-4	Vinyl Chloride	Yes	Yes	2.8E+00	C	2.8E+01	2.8E+00	No (2)	20	3.6	N
x	Trichloroethylene				Symbol	Value	Symbol	Value	Symbol	Value	
x	Vinyl Chloride				Symbol	Value	Symbol	Value	Symbol	Value	

See the Navigation Guide equation for Cia,c for vinyl chloride.

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 1
(ug/m ³) ⁻¹		(mg/m ³)		I	Cia,c	Cia,nc
		(mg/m ³)			(ug/m ³)	(ug/m ³)
		2.00E-01	I			8.8E+02
see note	I	2.00E-03	I	TCE	3.0E+00	8.8E+00
4.40E-06	I	1.00E-01	I	VC	2.8E+00	4.4E+02

APPENDIX F.6

**RAGS PART D TABLES FOR CHEMICALS
PRESENT AT NATURALLY OCCURRING LEVELS**

RAGS Part D Table 3

Medium-Specific Exposure Point Concentration Summary

LIST OF TABLES
RAGS PART D TABLE 3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Table No.

3.1.RME	Unpaved Surface Soil - North Waterfront
3.2.RME	Surface Soil - North Waterfront
3.3.RME	Subsurface Soil - North Waterfront
3.4.RME	Unpaved Surface Soil - Central Shipyard
3.5.RME	Surface Soil - Central Shipyard
3.6.RME	Subsurface Soil - Central Shipyard
3.7.RME	Unpaved Surface Soil - Former Building 234
3.8.RME	Surface Soil - Former Building 234
3.9.RME	Surface Soil - PCB Removal Area
3.10.RME	Unpaved Surface Soil - PCB Removal Area

TABLE 3.1.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Unpaved	Aluminum	mg/kg	5260	6680 (L)	9650	6680	mg/kg	95% Modified-t UCL	ProUCL 4.1.01
North Waterfront	Arsenic	mg/kg	4.58	6.21 (N)	9.81	6.21	mg/kg	95% KM (t) UCL	ProUCL 4.1.01
Surface Soil	Manganese	mg/kg	171	229 (N)	337	229	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma
L = Lognormal
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

TABLE 3.2.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DEREKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
North Waterfront	Aluminum	mg/kg	5690	6470 (G)	9650	6470	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01
	Arsenic	mg/kg	4.86	5.76 (G)	10.9	5.76	mg/kg	95% KM (BCA) UCL	ProUCL 4.1.01
	Manganese	mg/kg	211	255 (G)	340	255	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

TABLE 3.3.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
North Waterfront	Arsenic	mg/kg	6.1	7.0 (NP)	16.6	7.0	mg/kg	95% Student's-t UCL	ProUCL 4.1.01
	Manganese	mg/kg	210	248 (G)	549	248	mg/kg	95% Approximate Gamma UCL	ProUCL 4.1.01

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

TABLE 3.4.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current Medium: Surface Soil Exposure Medium: Surface Soil
--

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Unpaved Central Shipyard	Aluminum	mg/kg	(1)	(1)	13,100	13,100	mg/kg	Maximum Detected Concentration	(1)

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

TABLE 3.5.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Surface Soil Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Cental Shipyard	Aluminum	mg/kg	10,900	13,400 (N)	13,200	13,200	mg/kg	Maximum	(1)

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.
(1) Calculated 95% UCL exceeds the maximum concentration. Maximum concentration used as the EPC.

TABLE 3.6.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Cental Shipyard	Manganese	mg/kg	336	382 (N)	612	382	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

TABLE 3.7.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current Medium: Surface Soil Exposure Medium: Surface Soil
--

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Unpaved Building 234	Aluminum	mg/kg	7570	10200 (N)	11300	10200	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

1 There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

2 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.

U.S. EPA, 1994:Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

TABLE 3.8.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future Medium: Surface Soil Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Building 234	Aluminum	mg/kg	7360	9570 (N)	11300	9570	mg/kg	95% Student's-t UCL	ProUCL 4.1.01

G = Gamma

N = Normal

NP = Non-parametric

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

2 - The calculated 95% UCL exceeds the maximum concentration. The maximum concentration was used as the EPC.

3 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.

U.S. EPA, 1994:Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

TABLE 3.9.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Unpaved PCB Removal Area	Aluminum	mg/kg	(1)	(1)	12,300	12,300	mg/kg	Maximum Detected Concentration	(1)
	Chromium	mg/kg	(1)	(1)	15.8 J	15.8	mg/kg	Maximum Detected Concentration	(1)

G = Gamma
N = Normal
NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

TABLE 3.10.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORMER ROBERT E. DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
PCB Removal Area	Aluminum	mg/kg	(1)	(1)	12,300	12,300	mg/kg	Maximum Detected Concentration	(1)
	Chromium	mg/kg	(1)	(1)	15.8 J	15.8	mg/kg	Maximum Detected Concentration	(1)

G = Gamma

N = Normal

NP = Non-parametric

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

(1) There are less than five samples. Pro UCL will not calculate any statistics with less than five samples. Maximum Concentration is used for the EPC.

(2) There are less than four detected concentrations. Reliable statistics cannot be computed. The Maximum concentration was used as the EPC.

RAGS Part D Table 7

Calculation of Cancer Risks and Non-Cancer Hazards

North Waterfront

LIST OF TABLES
RAGS PART D TABLE 7 - NORTH WATERFRONT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.

Reasonable Maximum Exposures

7.1.RME	Current Adolescent Trespassers - North Waterfront
7.2.RME	Current Adult Trespassers - North Waterfront
7.3.RME	Current Industrial Workers - North Waterfront
7.4.RME	Future Adolescent Trespassers - North Waterfront
7.5.RME	Future Adult Trespassers - North Waterfront
7.6.RME	Future Industrial Workers - North Waterfront
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - North Waterfront
7.9.RME	Hypothetical Adult Residents - North Waterfront

TABLE 7.1.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
 Receptor Population: Trespasser
 Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6.680	mg/kg	2.5E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.8E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002	
				Arsenic	6.21	mg/kg	2.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.5E-07	1.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005	
				Manganese	229	mg/kg	8.6E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.0E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003	
			Exp. Route Total								3.5E-07					0.010	
			Dermal	Aluminum	6.680	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	6.21	mg/kg	1.5E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.3E-07	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004	
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								2.3E-07					0.004	
		Exposure Point Total								5.8E-07					0.01		
	Exposure Medium Total								5.8E-07					0.01			
	Air	North Waterfront	Inhalation	Aluminum	6.1E-7	mg/m ³	1.9E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.3E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000003	
				Arsenic	5.6E-10	mg/m ³	1.8E-12	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	7.6E-12	1.2E-11	(mg/m ³)	1.5E-05	(mg/m ³)	8.2E-7	
				Manganese	2.1E-8	mg/m ³	6.5E-11	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.6E-10	(mg/m ³)	5.0E-05	(mg/m ³)	0.000009	
			Exp. Route Total								7.6E-12					0.00001	
		Exposure Point Total								7.6E-12					0.00001		
	Exposure Medium Total								7.6E-12					0.00001			
Medium Total										5.8E-07				0.01			
						Total of Receptor Risks Across All Media					5.8E-07	Total of Receptor Hazards Across All Media					0.01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Current
 Receptor Population: Trespassers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient		
							Value	Units	Value	Units		Value	Units	Value	Units			
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6,680	mg/kg	3.6E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.001		
				Arsenic	6.21	mg/kg	3.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	5.0E-07	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004		
				Manganese	229	mg/kg	1.2E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.3E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.002		
			Exp. Route Total								5.0E-07					0.007		
			Dermal	Aluminum	6,680	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--		
				Arsenic	6.21	mg/kg	4.0E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	6.0E-08	1.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0005		
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--		
			Exp. Route Total								6.0E-08					0.0005		
		Exposure Point Total										5.6E-07				0.007		
		Exposure Medium Total										5.6E-07				0.007		
	Air	North Waterfront	Inhalation	Aluminum	6.1E-7	mg/m ³	3.8E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.3E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000003		
				Arsenic	5.6E-10	mg/m ³	3.5E-12	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	1.5E-11	1.2E-11	(mg/m ³)	1.5E-05	(mg/m ³)	8.2E-7		
				Manganese	2.1E-8	mg/m ³	1.3E-10	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.6E-10	(mg/m ³)	5.0E-05	(mg/m ³)	0.000009		
			Exp. Route Total								1.5E-11					0.00001		
			Exposure Point Total										1.5E-11				0.00001	
		Exposure Medium Total										1.5E-11				0.00001		
Medium Total											5.6E-07				0.007			
Total of Receptor Risks Across All Media											5.6E-07	Total of Receptor Hazards Across All Media					0.007	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6.680	mg/kg	2.3E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.007	
				Arsenic	6.21	mg/kg	2.2E-06	(mg/kg/day) ⁻¹	1.5E+00	(mg/kg/day) ⁻¹	3.3E-06	6.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Manganese	229	mg/kg	8.0E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.009	
			Exp. Route Total							3.3E-06					0.04		
			Dermal	Aluminum	6.680	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	6.21	mg/kg	4.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	6.4E-07	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004	
				Manganese	229	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total							6.4E-07					0.004		
		Exposure Point Total									3.9E-06				0.04		
		Exposure Medium Total									3.9E-06				0.04		
	Air	North Waterfront	Inhalation	Aluminum	6.1E-7	mg/m ³	5.0E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.4E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.00003	
				Arsenic	5.6E-10	mg/m ³	4.6E-11	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	2.0E-10	1.3E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.000009	
				Manganese	2.1E-8	mg/m ³	1.7E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.8E-09	(mg/m ³)	5.0E-05	(mg/m ³)	0.00010	
			Exp. Route Total							2.0E-10					0.0001		
		Exposure Point Total									2.0E-10				0.0001		
		Exposure Medium Total									2.0E-10				0.0001		
Medium Total											3.9E-06				0.04		
Total of Receptor Risks Across All Media											3.9E-06	Total of Receptor Hazards Across All Media					0.04

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
 Receptor Population: Trespasser
 Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6,470	mg/kg	2.4E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002	
				Arsenic	5.76	mg/kg	2.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.2E-07	1.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005	
				Manganese	255	mg/kg	9.6E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.7E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003	
			Exp. Route Total								3.2E-07					0.010	
			Dermal	Aluminum	6,470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	5.76	mg/kg	1.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.1E-07	1.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.003	
				Manganese	255	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								2.1E-07					0.003	
		Exposure Point Total								5.4E-07					0.01		
	Exposure Medium Total								5.4E-07					0.01			
	Air	North Waterfront	Inhalation	Aluminum	5.9E-7	mg/m ³	1.8E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.3E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000003	
				Arsenic	5.2E-10	mg/m ³	1.6E-12	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	7.1E-12	1.1E-11	(mg/m ³)	1.5E-05	(mg/m ³)	7.7E-7	
				Manganese	2.3E-8	mg/m ³	7.3E-11	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	5.1E-10	(mg/m ³)	5.0E-05	(mg/m ³)	0.00001	
			Exp. Route Total								7.1E-12					0.00001	
		Exposure Point Total								7.1E-12					0.00001		
	Exposure Medium Total								7.1E-12					0.00001			
Medium Total										5.4E-07					0.01		
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Arsenic	7.00	mg/kg	2.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.9E-07	1.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.006	
				Manganese	248	mg/kg	9.3E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.5E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003	
			Exp. Route Total								3.9E-07					0.009	
			Dermal	Arsenic	7.00	mg/kg	1.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	2.6E-07	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004	
				Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								2.6E-07					0.004	
		Exposure Point Total								6.5E-07					0.01		
	Exposure Medium Total								6.5E-07					0.01			
	Air	North Waterfront	Inhalation	Arsenic	6.4E-10	mg/m ³	2.0E-12	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	8.6E-12	1.4E-11	(mg/m ³)	1.5E-05	(mg/m ³)	9.3E-7	
				Manganese	2.3E-8	mg/m ³	7.1E-11	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.9E-10	(mg/m ³)	5.0E-05	(mg/m ³)	0.000010	
			Exp. Route Total								8.6E-12					0.00001	
		Exposure Point Total								8.6E-12					0.00001		
	Exposure Medium Total								8.6E-12					0.00001			
Medium Total										6.5E-07					0.01		
						Total of Receptor Risks Across All Media					1.2E-06	Total of Receptor Hazards Across All Media					0.03

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6.470	mg/kg	3.5E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.001	
				Arsenic	5.76	mg/kg	3.1E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	4.6E-07	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004	
				Manganese	255	mg/kg	1.4E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.8E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.002	
			Exp. Route Total							4.6E-07						0.007	
			Dermal	Aluminum	6.470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	5.76	mg/kg	3.7E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	5.6E-08	1.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0004	
				Manganese	255	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total							5.6E-08						0.0004	
		Exposure Point Total								5.2E-07						0.007	
	Exposure Medium Total								5.2E-07						0.007		
	Air	North Waterfront	Inhalation	Aluminum	5.9E-7	mg/m ³	3.7E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.3E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000003	
				Arsenic	5.2E-10	mg/m ³	3.3E-12	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	1.4E-11	1.1E-11	(mg/m ³)	1.5E-05	(mg/m ³)	7.7E-7	
				Manganese	2.3E-8	mg/m ³	1.5E-10	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	5.1E-10	(mg/m ³)	5.0E-05	(mg/m ³)	0.00001	
			Exp. Route Total							1.4E-11						0.00001	
			Exposure Point Total								1.4E-11						0.00001
			Exposure Medium Total								1.4E-11						0.00001
Medium Total								5.2E-07						0.007			
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Arsenic	7.00	mg/kg	3.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	5.6E-07	1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004	
				Manganese	248	mg/kg	1.3E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.7E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.002	
			Exp. Route Total							5.6E-07						0.006	
			Dermal	Arsenic	7.00	mg/kg	4.5E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	6.7E-08	1.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0005	
				Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
				Exp. Route Total							6.7E-08						0.0005
				Exposure Point Total								6.3E-07					0.007
			Exposure Medium Total								6.3E-07					0.007	
		Air	North Waterfront	Inhalation	Arsenic	6.4E-10	mg/m ³	4.0E-12	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	1.7E-11	1.4E-11	(mg/m ³)	1.5E-05	(mg/m ³)	9.3E-7
	Manganese				2.3E-8	mg/m ³	1.4E-10	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	4.9E-10	(mg/m ³)	5.0E-05	(mg/m ³)	0.000010	
	Exp. Route Total										1.7E-11					0.00001	
	Exposure Point Total									1.7E-11					0.00001		
	Exposure Medium Total								1.7E-11					0.00001			
	Medium Total								6.3E-07						0.007		
Total of Receptor Risks Across All Media											1.2E-06	Total of Receptor Hazards Across All Media					0.01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6,470	mg/kg	2.3E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.006
				Arsenic	5.76	mg/kg	2.0E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.0E-06	5.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Manganese	255	mg/kg	8.9E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.01
			Exp. Route Total							3.0E-06					0.04	
			Dermal	Aluminum	6,470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				Arsenic	5.76	mg/kg	4.0E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	6.0E-07	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				Manganese	255	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total							6.0E-07					0.004	
		Exposure Point Total							3.6E-06					0.04		
		Exposure Medium Total							3.6E-06					0.04		
	Air	North Waterfront	Inhalation	Aluminum	5.9E-7	mg/m ³	4.8E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.3E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.00003
				Arsenic	5.2E-10	mg/m ³	4.3E-11	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	1.8E-10	1.2E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.000008
				Manganese	2.3E-8	mg/m ³	1.9E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	5.3E-09	(mg/m ³)	5.0E-05	(mg/m ³)	0.0001
			Exp. Route Total							1.8E-10					0.0001	
		Exposure Point Total							1.8E-10					0.0001		
		Exposure Medium Total							1.8E-10					0.0001		
Medium Total										3.6E-06				0.04		
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Arsenic	7.00	mg/kg	2.4E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	3.7E-06	6.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Manganese	248	mg/kg	8.7E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.01
				Exp. Route Total							3.7E-06				0.03	
			Dermal	Arsenic	7.00	mg/kg	4.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	7.3E-07	1.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005
				Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total							7.3E-07					0.005	
		Exposure Point Total							4.4E-06					0.04		
		Exposure Medium Total							4.4E-06					0.04		
	Air	North Waterfront	Inhalation	Arsenic	6.4E-10	mg/m ³	5.2E-11	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	2.2E-10	1.5E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.000010
				Manganese	2.3E-8	mg/m ³	1.8E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	5.1E-09	(mg/m ³)	5.0E-05	(mg/m ³)	0.0001
				Exp. Route Total							2.2E-10				0.0001	
			Exposure Point Total							2.2E-10				0.0001		
		Exposure Medium Total							2.2E-10				0.0001			
		Medium Total										4.4E-06				0.04
Medium Total										8.0E-06	Total of Receptor Hazards Across All Media			0.08		

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RTC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6,470	mg/kg	1.6E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	1.1E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
				Arsenic	5.76	mg/kg	1.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	2.1E-07	9.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
				Manganese	255	mg/kg	6.1E-06	(mg/kg/day)	NA	(mg/kg/day) ¹	--	4.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
			Exp. Route Total							2.1E-07					0.06	
			Dermal	Aluminum	6,470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				Arsenic	5.76	mg/kg	1.2E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	1.9E-08	8.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.003
		Manganese		255	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
		Exp. Route Total							1.9E-08					0.003		
		Exposure Point Total							2.3E-07					0.06		
		Exposure Medium Total							2.3E-07					0.06		
	Air	North Waterfront	Inhalation	Aluminum	0.005	mg/m ³	7.8E-06	(mg/m ³)	NA	(ug/m ³) ¹	--	5.5E-04	(mg/m ³)	5.0E-03	(mg/m ³)	0.1
				Arsenic	4.1E-6	mg/m ³	7.0E-09	(mg/m ³)	4.3E-03	(ug/m ³) ¹	3.0E-08	4.9E-07	(mg/m ³)	1.5E-05	(mg/m ³)	0.03
				Manganese	1.8E-4	mg/m ³	3.1E-07	(mg/m ³)	NA	(ug/m ³) ¹	--	2.2E-05	(mg/m ³)	5.0E-05	(mg/m ³)	0.4
			Exp. Route Total							3.0E-08					0.6	
		Exposure Point Total							3.0E-08					0.6		
		Exposure Medium Total							3.0E-08					0.6		
Medium Total										2.6E-07				0.6		
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Arsenic	7.00	mg/kg	1.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	2.5E-07	1.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04
				Manganese	248	mg/kg	5.9E-06	(mg/kg/day)	NA	(mg/kg/day) ¹	--	4.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
				Exp. Route Total							2.5E-07				0.06	
			Dermal	Arsenic	7.00	mg/kg	1.5E-08	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	2.3E-08	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				Exp. Route Total							2.3E-08					0.004
		Exposure Point Total							2.7E-07					0.06		
		Exposure Medium Total							2.7E-07					0.06		
	Air	North Waterfront	Inhalation	Arsenic	5.0E-6	mg/m ³	8.5E-09	(mg/m ³)	4.3E-03	(ug/m ³) ¹	3.6E-08	5.9E-07	(mg/m ³)	1.5E-05	(mg/m ³)	0.04
				Manganese	1.8E-4	mg/m ³	3.0E-07	(mg/m ³)	NA	(ug/m ³) ¹	--	2.1E-05	(mg/m ³)	5.0E-05	(mg/m ³)	0.4
				Exp. Route Total							3.6E-08					0.5
			Exposure Point Total							3.6E-08					0.5	
		Exposure Medium Total							3.6E-08					0.5		
		Medium Total										3.1E-07				0.5
Medium Total										5.7E-07	Total of Receptor Hazards Across All Media			1.2		

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
 Receptor Population: Residents
 Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6.470	mg/kg	7.1E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.08	
				Arsenic	5.76	mg/kg	6.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	9.5E-06	7.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.2	
				Manganese	255	mg/kg	2.8E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.3E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.1	
			Exp. Route Total								9.5E-06					0.5	
			Dermal	Aluminum	6.470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	5.76	mg/kg	5.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	8.0E-07	6.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02	
				Manganese	255	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								8.0E-07					0.02	
		Exposure Point Total								1.0E-05					0.5		
		Exposure Medium Total								1.0E-05					0.5		
	Air	North Waterfront	Inhalation	Aluminum	5.9E-7	mg/m ³	4.8E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	5.6E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.0001	
				Arsenic	5.2E-10	mg/m ³	4.3E-11	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	1.9E-10	5.0E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.00003	
				Manganese	2.3E-8	mg/m ³	1.9E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.2E-08	(mg/m ³)	5.0E-05	(mg/m ³)	0.0004	
			Exp. Route Total								1.9E-10					0.0006	
		Exposure Point Total								1.9E-10					0.0006		
		Exposure Medium Total								1.9E-10					0.0006		
Medium Total											1.0E-05				0.5		
Subsurface Soil	Subsurface Soil	North Waterfront	Ingestion	Arsenic	7.00	mg/kg	7.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	1.2E-05	8.9E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.3	
				Manganese	248	mg/kg	2.7E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.2E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.1	
				Exp. Route Total								1.2E-05				0.4	
			Dermal	Arsenic	7.00	mg/kg	6.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ⁻¹	9.7E-07	7.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03	
				Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								9.7E-07					0.03	
		Exposure Point Total									1.2E-05				0.5		
		Exposure Medium Total									1.2E-05				0.5		
	Air	North Waterfront	Inhalation	Arsenic	6.4E-10	mg/m ³	5.2E-11	(mg/m ³)	4.3E-03	(ug/m ³) ⁻¹	2.2E-10	6.1E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.00004	
				Manganese	2.3E-8	mg/m ³	1.9E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.2E-08	(mg/m ³)	5.0E-05	(mg/m ³)	0.0004	
			Exp. Route Total								2.2E-10					0.0005	
		Exposure Point Total									2.2E-10				0.0005		
Exposure Medium Total										2.2E-10				0.0005			
Medium Total											1.2E-05				0.5		
Total of Receptor Risks Across All Media											2.3E-05	Total of Receptor Hazards Across All Media					0.9

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.9 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	North Waterfront	Ingestion	Aluminum	6.470	mg/kg	3.0E-03	(mg/kg/day)	NA	(mg/kg/day) ¹	--	8.9E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.009	
				Arsenic	5.76	mg/kg	2.7E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	4.1E-06	7.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03	
				Manganese	255	mg/kg	1.2E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	3.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.01	
			Exp. Route Total							4.1E-06					0.05		
			Dermal	Aluminum	6.470	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Arsenic	5.76	mg/kg	3.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	4.9E-07	9.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.003	
				Manganese	255	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total							4.9E-07					0.003		
		Exposure Point Total							4.5E-06					0.05			
		Exposure Medium Total							4.5E-06					0.05			
	Air	North Waterfront	Inhalation	Aluminum	5.9E-7	mg/m ³	1.9E-07	(mg/m ³)	NA	(ug/m ³) ¹	--	5.6E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.0001	
				Arsenic	5.2E-10	mg/m ³	1.7E-10	(mg/m ³)	4.3E-03	(ug/m ³) ¹	7.4E-10	5.0E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.00003	
				Manganese	2.3E-8	mg/m ³	7.6E-09	(mg/m ³)	NA	(ug/m ³) ¹	--	2.2E-08	(mg/m ³)	5.0E-05	(mg/m ³)	0.0004	
			Exp. Route Total							7.4E-10					0.0006		
			Exposure Point Total							7.4E-10					0.0006		
			Exposure Medium Total							7.4E-10					0.0006		
		Medium Total											4.5E-06				
Subsurface Soil		Subsurface Soil	North Waterfront	Ingestion	Arsenic	7.00	mg/kg	3.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	4.9E-06	9.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
	Manganese				248	mg/kg	1.2E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	3.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.01	
	Exp. Route Total									4.9E-06					0.05		
	Dermal			Arsenic	7.00	mg/kg	3.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day) ¹	5.9E-07	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004	
				Manganese	248	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
	Exp. Route Total									5.9E-07					0.004		
	Exposure Point Total								5.5E-06					0.05			
	Exposure Medium Total								5.5E-06					0.05			
	Air	North Waterfront	Inhalation	Arsenic	6.4E-10	mg/m ³	2.1E-10	(mg/m ³)	4.3E-03	(ug/m ³) ¹	9.0E-10	6.1E-10	(mg/m ³)	1.5E-05	(mg/m ³)	0.00004	
				Manganese	2.3E-8	mg/m ³	7.4E-09	(mg/m ³)	NA	(ug/m ³) ¹	--	2.2E-08	(mg/m ³)	5.0E-05	(mg/m ³)	0.0004	
			Exp. Route Total							9.0E-10					0.0005		
		Exposure Point Total							9.0E-10					0.0005			
		Exposure Medium Total							9.0E-10					0.0005			
Medium Total											5.5E-06					0.05	
Total of Receptor Risks Across All Media											1.0E-05	Total of Receptor Hazards Across All Media				0.1	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Central Shipyard

LIST OF TABLES
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CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.

Reasonable Maximum Exposures

7.1.RME	Current Adolescent Trespassers - Central Shipyard
7.2.RME	Current Adult Trespassers - Central Shipyard
7.3.RME	Current Industrial Workers - Central Shipyard
7.4.RME	Future Adolescent Trespassers - Central Shipyard
7.5.RME	Future Adult Trespassers - Central Shipyard
7.6.RME	Future Industrial Workers - Central Shipyard
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - Central Shipyard
7.9.RME	Hypothetical Adult Residents - Central Shipyard

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,100	mg/kg	4.9E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	3.4E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003	
			Exp. Route Total								--					0.003	
			Dermal	Aluminum	13,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									--					0.003	
	Exposure Medium Total										--					0.003	
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m ³	3.7E-09	(mg/m ³)	NA	(ug/m ³) ¹	--	2.6E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000005	
			Exp. Route Total									--					0.000005
			Exposure Point Total										--				0.000005
		Exposure Medium Total											--				0.000005
Medium Total											--				0.003		
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media					0.003

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Current
 Receptor Population: Trespassers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,100	mg/kg	7.0E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002	
			Exp. Route Total								--					0.002	
			Dermal	Aluminum	13,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									--					0.002	
	Exposure Medium Total										--					0.002	
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m ³	7.5E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.6E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000005	
			Exp. Route Total									--					0.000005
			Exposure Point Total										--				0.000005
		Exposure Medium Total											--				0.000005
Medium Total															0.002		
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media					0.002

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
 Receptor Population: Industrial Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,100	mg/kg	4.6E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
			Exp. Route Total								--					0.01
			Dermal	Aluminum	13,100	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
			Exp. Route Total								--					--
		Exposure Point Total									--					0.01
		Exposure Medium Total									--					0.01
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m³	9.7E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.7E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00005
			Exp. Route Total								--					0.00005
		Exposure Point Total									--					0.00005
		Exposure Medium Total									--					0.00005
Medium Total											--				0.01	
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media				0.01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,200	mg/kg	5.0E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
			Exp. Route Total						--					0.003		
			Dermal	Aluminum	13,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
			Exp. Route Total						--					--		
	Exposure Point Total								--					0.003		
	Exposure Medium Total								--					0.003		
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m³	3.8E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.6E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000005
			Exp. Route Total						--					0.000005		
	Exposure Point Total								--					0.000005		
	Exposure Medium Total								--					0.000005		
Medium Total										--					0.003	
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	1.4E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.0E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.004
			Exp. Route Total						--					0.004		
			Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total						--					--		
	Exposure Point Total								--					0.004		
	Exposure Medium Total								--					0.004		
	Air	Central Shipyard	Inhalation	Manganese	3.5E-8	mg/m³	1.1E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	7.6E-10	(mg/m³)	5.0E-05	(mg/m³)	0.00002
			Exp. Route Total						--					0.00002		
	Exposure Point Total								--					0.00002		
	Exposure Medium Total								--					0.00002		
Medium Total										--					0.004	
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media				0.008

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
 Receptor Population: Trespassers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,200	mg/kg	7.1E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002	
			Exp. Route Total								--					0.002	
			Dermal	Aluminum	13,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									--					0.002	
		Exposure Medium Total									--					0.002	
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m³	7.5E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.6E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000005	
			Exp. Route Total								--					0.000005	
		Exposure Point Total									--					0.000005	
		Exposure Medium Total									--					0.000005	
Medium Total															0.002		
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	2.1E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	7.2E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003	
			Exp. Route Total								--					0.003	
			Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									--					0.003	
		Exposure Medium Total									--					0.003	
	Air	Central Shipyard	Inhalation	Manganese	3.5E-8	mg/m³	2.2E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	7.6E-10	(mg/m³)	5.0E-05	(mg/m³)	0.00002	
			Exp. Route Total								--					0.00002	
		Exposure Point Total									--					0.00002	
		Exposure Medium Total									--					0.00002	
Medium Total															0.003		
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media					0.005

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6 RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
 Receptor Population: Industrial Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,200	mg/kg	4.6E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
			Exp. Route Total					--							0.01	
			Dermal	Aluminum	13,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
			Exp. Route Total					--							--	
		Exposure Point Total						--							0.01	
	Exposure Medium Total						--								0.01	
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m³	9.8E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.7E-07	(mg/m³)	5.0E-03	(mg/m³)	0.00005
			Exp. Route Total					--								0.00005
		Exposure Point Total						--								0.00005
	Exposure Medium Total						--									0.00005
Medium Total										--					0.01	
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	1.3E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.7E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
			Exp. Route Total					--								0.02
			Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total					--							--	
		Exposure Point Total						--								0.02
	Exposure Medium Total						--									0.02
	Air	Central Shipyard	Inhalation	Manganese	3.5E-8	mg/m³	2.8E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	7.9E-09	(mg/m³)	5.0E-05	(mg/m³)	0.0002
			Exp. Route Total					--								0.0002
		Exposure Point Total						--								0.0002
	Exposure Medium Total						--									0.0002
Medium Total										--					0.02	
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media				0.03

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,200	mg/kg	3.2E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02	
			Exp. Route Total					--				0.02					
			Dermal	Aluminum	13,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
			Exp. Route Total					--				--					
		Exposure Point Total					--							0.02			
	Exposure Medium Total					--								0.02			
	Air	Central Shipyard	Inhalation	Aluminum	0.009	mg/m ³	1.6E-05	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.1E-03	(mg/m ³)	5.0E-03	(mg/m ³)	0.2	
			Exp. Route Total					--							0.2		
			Exposure Point Total					--							0.2		
		Exposure Medium Total					--								0.2		
Medium Total					--									0.2			
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	9.2E-06	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03	
			Exp. Route Total					--							0.03		
			Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total					--							--		
		Exposure Point Total					--								0.03		
	Exposure Medium Total					--								0.03			
	Air	Central Shipyard	Inhalation	Manganese	2.7E-4	mg/m ³	4.6E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	3.2E-05	(mg/m ³)	5.0E-05	(mg/m ³)	0.6	
			Exp. Route Total					--							0.6		
			Exposure Point Total					--							0.6		
		Exposure Medium Total					--								0.6		
Medium Total					--									0.7			
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media					0.9

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Hypothetical
 Receptor Population: Residents
 Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13.200	mg/kg	1.4E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.2
			Exp. Route Total								--					0.2
			Dermal	Aluminum	13.200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
			Exp. Route Total								--					--
		Exposure Point Total									--					0.2
	Exposure Medium Total										--					0.2
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m³	9.9E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.2E-08	(mg/m³)	5.0E-03	(mg/m³)	0.0002
			Exp. Route Total								--					0.0002
		Exposure Point Total									--					0.0002
	Exposure Medium Total										--					0.0002
Medium Total											--					0.2
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	4.2E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	4.9E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.2
			Exp. Route Total								--					0.2
			Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total								--					--
		Exposure Point Total									--					0.2
	Exposure Medium Total										--					0.2
	Air	Central Shipyard	Inhalation	Manganese	3.5E-8	mg/m³	2.9E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	3.3E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0007
			Exp. Route Total								--					0.0007
		Exposure Point Total									--					0.0007
	Exposure Medium Total										--					0.0007
Medium Total											--					0.2
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media				0.4

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.9.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Hypothetical
 Receptor Population: Residents
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Central Shipyard	Ingestion	Aluminum	13,200	mg/kg	6.2E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.8E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
			Exp. Route Total						--					0.02		
			Dermal	Aluminum	13,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
			Exp. Route Total						--					--		
		Exposure Point Total								--					0.02	
	Exposure Medium Total								--					0.02		
	Air	Central Shipyard	Inhalation	Aluminum	1.2E-6	mg/m ³	3.9E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.2E-06	(mg/m ³)	5.0E-03	(mg/m ³)	0.0002
			Exp. Route Total						--					0.0002		
		Exposure Point Total								--					0.0002	
	Exposure Medium Total								--					0.0002		
Medium Total										--				0.02		
Subsurface Soil	Subsurface Soil	Central Shipyard	Ingestion	Manganese	382	mg/kg	1.8E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	5.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
			Exp. Route Total						--					0.02		
			Dermal	Manganese	382	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total						--					--		
		Exposure Point Total								--					0.02	
	Exposure Medium Total								--					0.02		
	Air	Central Shipyard	Inhalation	Manganese	3.5E-8	mg/m ³	1.1E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	3.3E-08	(mg/m ³)	5.0E-05	(mg/m ³)	0.0007
			Exp. Route Total						--					0.0007		
		Exposure Point Total								--					0.0007	
	Exposure Medium Total								--					0.0007		
Medium Total										--				0.02		
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media				0.04

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Former Building 234

LIST OF TABLES
RAGS PART D TABLE 7 - FORMER BUILDING 234
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.

Reasonable Maximum Exposures

7.1.RME	Current Adolescent Trespassers - Central Shipyard
7.2.RME	Current Adult Trespassers - Central Shipyard
7.3.RME	Current Industrial Workers - Central Shipyard
7.4.RME	Future Adolescent Trespassers - Central Shipyard
7.5.RME	Future Adult Trespassers - Central Shipyard
7.6.RME	Future Industrial Workers - Central Shipyard
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - Central Shipyard
7.9.RME	Hypothetical Adult Residents - Central Shipyard

TABLE 7.1 RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Current
 Receptor Population: Trespasser
 Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	10,200	mg/kg	3.8E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	2.7E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003	
			Exp. Route Total								--					0.003	
			Dermal	Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									--					0.003	
	Exposure Medium Total									--						0.003	
	Air	Former Building 234	Inhalation	Aluminum	9.3E-7	mg/m ³	2.9E-09	(mg/m ³)	NA	(ug/m ³) ¹	--	2.0E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000004	
			Exp. Route Total								--					0.000004	
		Exposure Point Total									--					0.000004	
	Exposure Medium Total										--					0.000004	
Medium Total											--					0.003	
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media					0.003

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Current
 Receptor Population: Trespassers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	10,200	mg/kg	5.5E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.9E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002	
			Exp. Route Total						--					0.002			
			Dermal	Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
			Exp. Route Total						--					--			
		Exposure Point Total							--						0.002		
	Exposure Medium Total							--							0.002		
	Air	Former Building 234	Inhalation	Aluminum	9.3E-7	mg/m³	5.8E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	2.0E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000004	
			Exp. Route Total						--						0.000004		
			Exposure Point Total							--						0.000004	
		Exposure Medium Total							--							0.000004	
Medium Total										--					0.002		
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media					0.002

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Current
 Receptor Population: Industrial Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	10,200	mg/kg	3.6E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.010	
			Exp. Route Total								--					0.010	
			Dermal	Aluminum	10,200	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									--					0.010	
	Exposure Medium Total									--					0.010		
	Air	Former Building 234	Inhalation	Aluminum	9.3E-7	mg/m ³	7.6E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.1E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.00004	
			Exp. Route Total								--					0.00004	
			Exposure Point Total									--				0.00004	
		Exposure Medium Total									--					0.00004	
Medium Total										--					0.01		
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media					0.01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Future
 Receptor Population: Trespasser
 Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	9.570	mg/kg	3.6E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
			Exp. Route Total						--					0.003		
			Dermal	Aluminum	9.570	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
			Exp. Route Total						--					--		
		Exposure Point Total								--					0.003	
	Exposure Medium Total								--					0.003		
	Air	Former Building 234	Inhalation	Aluminum	8.7E-7	mg/m³	2.7E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.9E-08	(mg/m³)	5.0E-03	(mg/m³)	0.000004
			Exp. Route Total						--					0.000004		
		Exposure Point Total								--					0.000004	
	Exposure Medium Total								--					0.000004		
Medium Total											--				0.003	
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media				0.003

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Future
 Receptor Population: Trespassers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	9,570	mg/kg	5.1E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.8E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002	
			Exp. Route Total								--					0.002	
			Dermal	Aluminum	9,570	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									--					0.002	
	Exposure Medium Total									--						0.002	
	Air	Former Building 234	Inhalation	Aluminum	8.7E-7	mg/m ³	5.4E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.9E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000004	
			Exp. Route Total								--					0.000004	
		Exposure Point Total									--					0.000004	
	Exposure Medium Total									--						0.000004	
Medium Total																0.002	
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media					0.002

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Future
 Receptor Population: Industrial Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	9.570	mg/kg	3.3E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.4E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.009
			Exp. Route Total						--					0.009		
			Dermal	Aluminum	9.570	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
			Exp. Route Total						--					--		
		Exposure Point Total							--						0.009	
	Exposure Medium Total							--							0.009	
	Air	Former Building 234	Inhalation	Aluminum	8.7E-7	mg/m ³	7.1E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.0E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.00004
			Exp. Route Total						--						0.00004	
		Exposure Point Total							--						0.00004	
	Exposure Medium Total							--							0.00004	
Medium Total										--					0.009	
Total of Receptor Risks Across All Media										--	Total of Receptor Hazards Across All Media				0.009	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Current/Future
 Receptor Population: Construction Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	9,570	mg/kg	2.3E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.6E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
			Exp. Route Total						--						0.02	
			Dermal	Aluminum	9,570	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
			Exp. Route Total						--						--	
		Exposure Point Total						--						0.02		
		Exposure Medium Total						--						0.02		
	Air	Former Building 234	Inhalation	Aluminum	0.007	mg/m ³	1.2E-05	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	8.1E-04	(mg/m ³)	5.0E-03	(mg/m ³)	0.2
			Exp. Route Total						--						0.2	
			Exposure Point Total						--						0.2	
		Exposure Medium Total						--						0.2		
	Medium Total										--					0.2
	Total of Receptor Risks Across All Media										--	Total of Receptor Hazards Across All Media				

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8 RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Hypothetical
 Receptor Population: Residents
 Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	9.570	mg/kg	1.0E-02	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.1
			Exp. Route Total						--					0.1		
			Dermal	Aluminum	9.570	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
			Exp. Route Total						--					--		
		Exposure Point Total						--					0.1			
		Exposure Medium Total						--					0.1			
	Air	Former Building 234	Inhalation	Aluminum	8.7E-7	mg/m ³	7.2E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	8.3E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.0002
			Exp. Route Total						--					0.0002		
			Exposure Point Total						--					0.0002		
			Exposure Medium Total						--					0.0002		
		Medium Total						--					0.1			
		Total of Receptor Risks Across All Media					--	Total of Receptor Hazards Across All Media					0.1			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.9.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Hypothetical
 Receptor Population: Residents
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Former Building 234	Ingestion	Aluminum	9,570	mg/kg	4.5E-03	(mg/kg/day)	NA	(mg/kg/day) ¹	--	1.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
			Exp. Route Total						--					0.01		
			Dermal	Aluminum	9,570	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
			Exp. Route Total						--					--		
		Exposure Point Total						--							0.01	
	Exposure Medium Total						--							0.01		
	Air	Former Building 234	Inhalation	Aluminum	8.7E-7	mg/m ³	2.9E-07	(mg/m ³)	NA	(ug/m ³) ¹	--	8.3E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.0002
			Exp. Route Total						--						0.0002	
			Exposure Point Total						--						0.0002	
		Exposure Medium Total						--						0.0002		
Medium Total											--				0.01	
							Total of Receptor Risks Across All Media				--	Total of Receptor Hazards Across All Media				0.01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

South Waterfront

LIST OF TABLES
RAGS PART D TABLE 7 - SOUTH WATERFRONT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.

Reasonable Maximum Exposures

7.1.RME	Future Adolescent Trespassers - South Waterfront
7.2.RME	Future Adult Trespassers - South Waterfront
7.3.RME	Future Industrial Workers - South Waterfront
7.4.RME	Current/Future Construction Workers - North Waterfront
7.5.RME	Hypothetical Child Residents - South Waterfront
7.6.RME	Hypothetical Adult Residents - South Waterfront

TABLE 7.1.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Future
 Receptor Population: Trespasser
 Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Manganese	692	mg/kg	2.6E-05	(mg/kg/day)	NA	(mg/kg/day) ¹	--	1.8E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.008
			Exp. Route Total								--					0.008
			Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total								--				--	
		Exposure Point Total								--					0.008	
	Exposure Medium Total									--					0.008	
	Air	South Waterfront	Inhalation	Manganese	6.3E-8	mg/m ³	2.0E-10	(mg/m ³)	NA	(ug/m ³) ¹	--	1.4E-09	(mg/m ³)	5.0E-05	(mg/m ³)	0.00003
			Exp. Route Total								--					0.00003
		Exposure Point Total									--					0.00003
	Exposure Medium Total										--					0.00003
Medium Total															0.008	
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media				0.008

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Future
 Receptor Population: Trespassers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Manganese	692	mg/kg	3.7E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.005	
			Exp. Route Total						--					0.005			
			Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total											--			
		Exposure Point Total									--					0.005	
	Exposure Medium Total										--					0.005	
	Air	South Waterfront	Inhalation	Manganese	6.3E-8	mg/m³	3.9E-10	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.4E-09	(mg/m³)	5.0E-05	(mg/m³)	0.00003	
			Exp. Route Total								--					0.00003	
			Exposure Point Total									--					0.00003
		Exposure Medium Total										--					0.00003
Medium Total											--					0.005	
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media					0.005

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Current/Future
 Receptor Population: Industrial Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Manganese	692	mg/kg	2.4E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	6.8E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03
			Exp. Route Total						--					0.03		
			Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total							--					--	
		Exposure Point Total								--					0.03	
	Exposure Medium Total										--				0.03	
	Air	South Waterfront	Inhalation	Manganese	6.3E-8	mg/m³	5.1E-09	(mg/m³)	NA	(ug/m³) ⁻¹	--	1.4E-08	(mg/m³)	5.0E-05	(mg/m³)	0.0003
			Exp. Route Total								--					0.0003
			Exposure Point Total								--					0.0003
		Exposure Medium Total										--				0.0003
	Medium Total											--				0.03
Total of Receptor Risks Across All Media										--	Total of Receptor Hazards Across All Media					0.03

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Current/Future
 Receptor Population: Construction Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units			Value	Units	Value		Units
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Manganese	692	mg/kg	1.7E-05	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.05	
			Exp. Route Total								--					0.05	
			Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									--					0.05	
	Exposure Medium Total										--					0.05	
	Air	South Waterfront	Inhalation	Manganese	4.9E-4	mg/m ³	8.4E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	5.9E-05	(mg/m ³)	5.0E-05	(mg/m ³)	1.2	
			Exp. Route Total									--					1.2
			Exposure Point Total										--				1.2
		Exposure Medium Total										--					1.2
Medium Total											--					1.2	
Total of Receptor Risks Across All Media											--	Total of Receptor Hazards Across All Media					1.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Hypothetical
 Receptor Population: Residents
 Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Manganese	692	mg/kg	7.6E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	8.8E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.4
			Exp. Route Total							--					0.4	
			Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
			Exp. Route Total							--					--	
		Exposure Point Total								--					0.4	
		Exposure Medium Total								--					0.4	
	Air	South Waterfront	Inhalation	Manganese	6.3E-8	mg/m ³	5.2E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	6.0E-08	(mg/m ³)	5.0E-05	(mg/m ³)	0.001
			Exp. Route Total							--					0.001	
		Exposure Point Total								--					0.001	
		Exposure Medium Total								--					0.001	
Medium Total										--					0.4	
Total of Receptor Risks Across All Media										--	Total of Receptor Hazards Across All Media					0.4

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Hypothetical
 Receptor Population: Residents
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Subsurface Soil	Subsurface Soil	South Waterfront	Ingestion	Manganese	692	mg/kg	3.3E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	9.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04	
			Exp. Route Total						--					0.04			
			Dermal	Manganese	692	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--	
			Exp. Route Total						--					--			
		Exposure Point Total						--						0.04			
		Exposure Medium Total						--						0.04			
	Air	South Waterfront	Inhalation	Manganese	6.3E-8	mg/m³	2.1E-08	(mg/m³)	NA	(ug/m³) ⁻¹	--	6.0E-08	(mg/m³)	5.0E-05	(mg/m³)	0.001	
			Exp. Route Total						--						0.001		
			Exposure Point Total						--						0.001		
		Exposure Medium Total						--							0.001		
	Medium Total										--					0.04	
							Total of Receptor Risks Across All Media					--	Total of Receptor Hazards Across All Media				

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

PCB Removal Area

LIST OF TABLES
RAGS PART D TABLE 7 - PCB REMOVAL AREA
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.

Reasonable Maximum Exposures

7.1.RME	Current Adolescent Trespassers - PCB Removal Area
7.2.RME	Current Adult Trespassers - PCB Removal Area
7.3.RME	Current Industrial Workers - PCB Removal Area
7.4.RME	Future Adolescent Trespassers - PCB Removal Area
7.5.RME	Future Adult Trespassers - PCB Removal Area
7.6.RME	Future Industrial Workers - PCB Removal Area
7.7.RME	Current/Future Construction Workers - North Waterfront
7.8.RME	Hypothetical Child Residents - PCB Removal Area
7.9.RME	Hypothetical Adult Residents - PCB Removal Area

TABLE 7.1 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient		
							Value	Units	Value	Units		Value	Units	Value	Units			
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12,300	mg/kg	4.6E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	3.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003		
				Chromium	15.8	mg/kg	1.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	8.9E-07	4.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001		
			Exp. Route Total								8.9E-07					0.005		
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--		
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--		
			Exp. Route Total								--					--		
		Exposure Point Total									8.9E-07					0.005		
	Exposure Medium Total									8.9E-07					0.005			
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m ³	3.5E-09	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.5E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000005		
				Chromium	1.4E-9	mg/m ³	1.3E-11	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.1E-09	3.1E-11	(mg/m ³)	1.0E-04	(mg/m ³)	3.1E-7		
			Exp. Route Total								1.1E-09					0.000005		
			Exposure Point Total								1.1E-09					0.000005		
		Exposure Medium Total									1.1E-09					0.000005		
	Medium Total										8.9E-07					0.005		
Total of Receptor Risks Across All Media											8.9E-07	Total of Receptor Hazards Across All Media					0.005	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Current
 Receptor Population: Trespassers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12.300	mg/kg	6.6E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	2.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002	
				Chromium	15.8	mg/kg	8.5E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ¹	4.2E-07	3.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0010	
			Exp. Route Total								4.2E-07					0.003	
			Dermal	Aluminum	12.300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									4.2E-07					0.003	
		Exposure Medium Total									4.2E-07					0.003	
		Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m ³	7.0E-09	(mg/m ³)	NA	(ug/m ³) ¹	--	2.5E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000005
					Chromium	1.4E-9	mg/m ³	9.0E-12	(mg/m ³)	8.4E-02	(ug/m ³) ¹	7.6E-10	3.1E-11	(mg/m ³)	1.0E-04	(mg/m ³)	3.1E-7
	Exp. Route Total										7.6E-10					0.000005	
	Exposure Point Total									7.6E-10					0.000005		
	Exposure Medium Total										7.6E-10					0.000005	
	Medium Total											4.2E-07				0.003	
							Total of Receptor Risks Across All Media				4.2E-07	Total of Receptor Hazards Across All Media				0.003	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Current
 Receptor Population: Industrial Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12,300	mg/kg	4.3E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01	
				Chromium	15.8	mg/kg	5.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	2.8E-06	1.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005	
			Exp. Route Total								2.8E-06					0.02	
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									2.8E-06					0.02	
	Exposure Medium Total										2.8E-06					0.02	
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m ³	9.1E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.6E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.00005	
				Chromium	1.4E-9	mg/m ³	1.2E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	9.8E-09	3.3E-10	(mg/m ³)	1.0E-04	(mg/m ³)	0.000003	
			Exp. Route Total								9.8E-09					0.00005	
			Exposure Point Total								9.8E-09					0.00005	
		Exposure Medium Total									9.8E-09					0.00005	
	Medium Total											2.8E-06				0.02	
Total of Receptor Risks Across All Media											2.8E-06	Total of Receptor Hazards Across All Media					0.02

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4 RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Future
 Receptor Population: Trespasser
 Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12.300	mg/kg	4.6E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	3.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003	
				Chromium	15.8	mg/kg	1.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ¹	8.9E-07	4.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.001	
			Exp. Route Total								8.9E-07					0.005	
			Dermal	Aluminum	12.300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									8.9E-07					0.005	
	Exposure Medium Total										8.9E-07					0.005	
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m ³	3.5E-09	(mg/m ³)	NA	(ug/m ³) ¹	--	2.5E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000005	
				Chromium	1.4E-9	mg/m ³	1.3E-11	(mg/m ³)	6.4E-02	(ug/m ³) ¹	1.1E-09	3.1E-11	(mg/m ³)	1.0E-04	(mg/m ³)	3.1E-7	
			Exp. Route Total								1.1E-09					0.000005	
		Exposure Point Total									1.1E-09					0.000005	
	Exposure Medium Total										1.1E-09					0.000005	
Medium Total											8.9E-07				0.005		
Total of Receptor Risks Across All Media											8.9E-07	Total of Receptor Hazards Across All Media					0.005

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5 RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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Scenario Timeframe: Future
 Receptor Population: Trespassers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	ingestion	Aluminum	12,300	mg/kg	6.6E-04	(mg/kg/day)	NA	(mg/kg/day) ¹	--	2.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002	
				Chromium	15.8	mg/kg	8.5E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ¹	4.2E-07	3.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0010	
				Exp. Route Total							4.2E-07					0.003	
				Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
				Exp. Route Total							--					--	
			Exposure Point Total							4.2E-07						0.003	
			Exposure Medium Total							4.2E-07						0.003	
		Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m ³	7.0E-09	(mg/m ³)	NA	(ug/m ³) ¹	--	2.5E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.000005
					Chromium	1.4E-9	mg/m ³	9.0E-12	(mg/m ³)	8.4E-02	(ug/m ³) ¹	7.6E-10	3.1E-11	(mg/m ³)	1.0E-04	(mg/m ³)	3.1E-7
				Exp. Route Total							7.6E-10					0.000005	
			Exposure Point Total							7.6E-10						0.000005	
		Exposure Medium Total							7.6E-10						0.000005		
	Medium Total										4.2E-07					0.003	
Total of Receptor Risks Across All Media											4.2E-07	Total of Receptor Hazards Across All Media					0.003

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Current/Future
 Receptor Population: Industrial Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12.300	mg/kg	4.3E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.2E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01	
				Chromium	15.8	mg/kg	5.5E-06	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	2.8E-06	1.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005	
			Exp. Route Total								2.8E-06					0.02	
			Dermal	Aluminum	12.300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									2.8E-06					0.02	
	Exposure Medium Total										2.8E-06					0.02	
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m ³	9.1E-08	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	2.6E-07	(mg/m ³)	5.0E-03	(mg/m ³)	0.00005	
				Chromium	1.4E-9	mg/m ³	1.2E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	9.8E-09	3.3E-10	(mg/m ³)	1.0E-04	(mg/m ³)	0.000003	
			Exp. Route Total								9.8E-09					0.00005	
		Exposure Point Total									9.8E-09					0.00005	
	Exposure Medium Total										9.8E-09					0.00005	
	Medium Total												2.8E-06				0.02
Total of Receptor Risks Across All Media											2.8E-06	Total of Receptor Hazards Across All Media					0.02

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7.RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Current/Future
 Receptor Population: Construction Workers
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12,300	mg/kg	3.0E-04	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	2.1E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02	
				Chromium	15.8	mg/kg	3.8E-07	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	1.9E-07	2.7E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.001	
			Exp. Route Total								1.9E-07					0.02	
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									1.9E-07					0.02	
	Exposure Medium Total										1.9E-07					0.02	
	Air	PCB Removal Area	Inhalation	Aluminum	0.009	mg/m ³	1.5E-05	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.0E-03	(mg/m ³)	5.0E-03	(mg/m ³)	0.2	
				Chromium	1.1E-5	mg/m ³	1.9E-08	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	1.6E-06	1.3E-06	(mg/m ³)	1.0E-04	(mg/m ³)	0.01	
			Exp. Route Total								1.6E-06					0.2	
		Exposure Point Total									1.6E-06					0.2	
		Exposure Medium Total										1.6E-06					0.2
	Medium Total										1.8E-06					0.2	
Total of Receptor Risks Across All Media											1.8E-06	Total of Receptor Hazards Across All Media					0.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12,300	mg/kg	1.3E-02	(mg/kg/day) ¹	NA	(mg/kg/day) ¹	--	1.6E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.2	
				Chromium	15.8	mg/kg	9.2E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ¹	4.6E-05	2.0E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.07	
			Exp. Route Total								4.6E-05					0.2	
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									4.6E-05					0.2	
	Exposure Medium Total										4.6E-05					0.2	
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m ³	9.2E-08	(mg/m ³)	NA	(ug/m ³) ¹	--	1.1E-08	(mg/m ³)	5.0E-03	(mg/m ³)	0.0002	
				Chromium	1.4E-9	mg/m ³	6.3E-10	(mg/m ³)	8.4E-02	(ug/m ³) ¹	5.3E-08	1.4E-09	(mg/m ³)	1.0E-04	(mg/m ³)	0.00001	
			Exp. Route Total								5.3E-08					0.0002	
			Exposure Point Total									5.3E-08					0.0002
		Exposure Medium Total										5.3E-08					0.0002
	Medium Total											4.6E-05					0.2
Total of Receptor Risks Across All Media											4.6E-05	Total of Receptor Hazards Across All Media					0.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.9 RME
 CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
 REASONABLE MAXIMUM EXPOSURES
 FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
 PAGE 1 OF 1

Scenario Timeframe: Future
 Receptor Population: Residents
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RID/RIC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Surface Soil	Surface Soil	PCB Removal Area	Ingestion	Aluminum	12,300	mg/kg	5.8E-03	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	1.7E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02	
				Chromium	15.8	mg/kg	1.4E-05	(mg/kg/day)	5.0E-01	(mg/kg/day) ⁻¹	6.8E-06	2.2E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.007	
			Exp. Route Total								6.8E-06					0.02	
			Dermal	Aluminum	12,300	mg/kg	0.0E+00	(mg/kg/day)	NA	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--	
				Chromium	15.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	(mg/kg/day) ⁻¹	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--	
			Exp. Route Total								--					--	
		Exposure Point Total									6.8E-06					0.02	
	Exposure Medium Total									6.8E-06					0.02		
	Air	PCB Removal Area	Inhalation	Aluminum	1.1E-6	mg/m ³	3.7E-07	(mg/m ³)	NA	(ug/m ³) ⁻¹	--	1.1E-06	(mg/m ³)	5.0E-03	(mg/m ³)	0.0002	
				Chromium	1.4E-9	mg/m ³	8.7E-10	(mg/m ³)	8.4E-02	(ug/m ³) ⁻¹	7.3E-08	1.4E-09	(mg/m ³)	1.0E-04	(mg/m ³)	0.00001	
			Exp. Route Total								7.3E-08					0.0002	
			Exposure Point Total									7.3E-08					0.0002
			Exposure Medium Total									7.3E-08					0.0002
			Medium Total									6.9E-06					0.02
Total of Receptor Risks Across All Media											6.9E-06	Total of Receptor Hazards Across All Media					0.02

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

RAGS Part D Table 9
Summary of Receptor Risks and Hazards for COPCs

North Waterfront

LIST OF TABLES
RAGS PART D TABLE 9 - NORTH WATERFRONT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

9.1.RME	Current Adolescent Trespassers - North Waterfront
9.2.RME	Current Adult Trespassers - North Waterfront
9.3.RME	Current Lifelong Trespassers - North Waterfront
9.4.RME	Current Industrial Workers - North Waterfront
9.5.RME	Future Adolescent Trespassers - North Waterfront
9.6.RME	Future Adult Trespassers - North Waterfront
9.7.RME	Future Lifelong Trespassers - North Waterfront
9.8.RME	Future Industrial Workers - North Waterfront
9.9.RME	Current/Future Construction Workers - North Waterfront
9.10.RME	Hypothetical Child Residents - North Waterfront
9.11.RME	Hypothetical Adult Residents - North Waterfront
9.12.RME	Hypothetical Lifelong Residents - North Waterfront

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	0.002	--	--	0.002	
			Arsenic	3E-07	--	2E-07	--	6E-07		0.005	--	0.004	0.009	
			Manganese	--	--	--	--	--		0.003	--	--	0.003	
			Chemical Total	3E-07	--	2E-07	--	6E-07		0.010	--	0.004	0.01	
		Exposure Point Total								6E-07				0.01
		Exposure Medium Total								6E-07				0.01
	Air	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	--	0.000003	--	0.000003	
			Arsenic	--	8E-12	--	--	8E-12		--	0.0000008	--	0.0000008	
			Manganese	--	--	--	--	--		--	0.000009	--	0.000009	
			Chemical Total	--	8E-12	--	--	8E-12		--	0.00001	--	0.00001	
		Exposure Point Total								8E-12				0.00001
		Exposure Medium Total								8E-12				0.00001
Medium Total								6E-07				0.01		
Receptor Total			Receptor Risk Total					6E-07	Receptor HI Total			0.01		

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--	CNS	0.001	--	--	0.001	
			Arsenic	5E-07	--	6E-08	--	6E-07	Skin, CVS	0.004	--	0.0005	0.004	
			Manganese	--	--	--	--	--	CNS	0.002	--	--	0.002	
			Chemical Total	5E-07	--	6E-08	--	6E-07		0.007	--	0.0005	0.007	
		Exposure Point Total			6E-07					0.007				
		Exposure Medium Total			6E-07					0.007				
	Air	North Waterfront	Aluminum	--	--	--	--	--	CNS	--	0.000003	--	0.000003	
			Arsenic	--	2E-11	--	--	2E-11	Skin, CVS	--	0.0000008	--	0.0000008	
			Manganese	--	--	--	--	--	CNS	--	0.000009	--	0.000009	
			Chemical Total	--	2E-11	--	--	2E-11		--	0.00001	--	0.00001	
		Exposure Point Total			2E-11					0.00001				
		Exposure Medium Total			2E-11					0.00001				
Medium Total			6E-07					0.007						
Receptor Total			Receptor Risk Total 6E-07					Receptor HI Total 0.007						

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient									
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total					
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--										
			Arsenic	8E-07	--	3E-07	--	1E-06										
			Manganese	--	--	--	--	--										
			Chemical Total	8E-07	--	3E-07	--	1E-06										
		Exposure Point Total																
		Exposure Medium Total																
	Air	North Waterfront	Aluminum	--	--	--	--	--										
			Arsenic	--	2E-11	--	--	2E-11										
			Manganese	--	--	--	--	--										
			Chemical Total	--	2E-11	--	--	2E-11										
Exposure Point Total																		
Exposure Medium Total																		
Medium Total																		
Receptor Total			Receptor Risk Total					1E-06										

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	0.007	--	--	0.007
			Arsenic	3E-06	--	6E-07	--	4E-06		0.02	--	0.004	0.02
			Manganese	--	--	--	--	--		0.009	--	--	0.009
			Chemical Total	3E-06	--	6E-07	--	4E-06		0.04	--	0.004	0.04
		Exposure Point Total						4E-06					0.04
		Exposure Medium Total						4E-06					0.04
	Air	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	--	0.00003	--	0.00003
			Arsenic	--	2E-10	--	--	2E-10		--	0.000009	--	0.000009
			Manganese	--	--	--	--	--		--	0.00010	--	0.00010
			Chemical Total	--	2E-10	--	--	2E-10		--	0.0001	--	0.0001
		Exposure Point Total						2E-10					0.0001
		Exposure Medium Total						2E-10					0.0001
Medium Total								4E-06					0.04
Receptor Total								4E-06					0.04

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	0.002	--	--	0.002	
			Arsenic	3E-07	--	2E-07	--	5E-07		0.005	--	0.003	0.008	
			Manganese	--	--	--	--	--		0.003	--	--	0.003	
			Chemical Total	3E-07	--	2E-07	--	5E-07		0.010	--	0.003	0.01	
		Exposure Point Total												
		Exposure Medium Total												
	Air	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	--	0.000003	--	0.000003	
			Arsenic	--	7E-12	--	--	7E-12		--	0.0000008	--	0.0000008	
			Manganese	--	--	--	--	--		--	0.00001	--	0.00001	
			Chemical Total	--	7E-12	--	--	7E-12		--	0.00001	--	0.00001	
		Exposure Point Total												
		Exposure Medium Total												
Medium Total														
Subsurface Soil	Subsurface Soil	North Waterfront	Arsenic	4E-07	--	3E-07	--	7E-07	Skin, CVS CNS	0.006	--	0.004	0.01	
			Manganese	--	--	--	--	--		0.003	--	--	0.003	
			Chemical Total	4E-07	--	3E-07	--	7E-07		0.009	--	0.004	0.01	
			Chemical Total	4E-07	--	3E-07	--	7E-07		0.009	--	0.004	0.01	
		Exposure Point Total												
		Exposure Medium Total												
	Air	North Waterfront	Arsenic	--	9E-12	--	--	9E-12	Skin, CVS CNS	--	0.0000009	--	0.0000009	
			Manganese	--	--	--	--	--		--	0.000010	--	0.000010	
			Chemical Total	--	9E-12	--	--	9E-12		--	0.00001	--	0.00001	
			Chemical Total	--	9E-12	--	--	9E-12		--	0.00001	--	0.00001	
		Exposure Point Total												
		Exposure Medium Total												
Medium Total														
Receptor Total				Receptor Risk Total					Receptor HI Total					
				1E-06					0.03					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DEREKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	0.001	--	--	0.001	
			Arsenic	5E-07	--	6E-08	--	5E-07		0.004	--	0.0004	0.004	
			Manganese	--	--	--	--	--		0.002	--	--	0.002	
			Chemical Total	5E-07	--	6E-08	--	5E-07		0.007	--	0.0004	0.007	
	Exposure Point Total													0.007
	Exposure Medium Total													0.007
	Air	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	--	0.000003	--	0.000003	
			Arsenic	--	1E-11	--	--	1E-11		--	0.0000008	--	0.0000008	
			Manganese	--	--	--	--	--		--	0.00001	--	0.00001	
			Chemical Total	--	1E-11	--	--	1E-11		--	0.00001	--	0.00001	
	Exposure Point Total													0.00001
	Exposure Medium Total													0.00001
	Medium Total													0.007
	Subsurface Soil	Subsurface Soil	North Waterfront	Arsenic	6E-07	--	7E-08	--	6E-07	Skin, CVS CNS	0.004	--	0.0005	0.005
Manganese				--	--	--	--	--	0.002		--	--	0.002	
Chemical Total				6E-07	--	7E-08	--	6E-07	0.006		--	0.0005	0.007	
Exposure Point Total														0.007
Exposure Medium Total													0.007	
Air		North Waterfront	Arsenic	--	2E-11	--	--	2E-11	Skin, CVS CNS	--	0.0000009	--	0.0000009	
			Manganese	--	--	--	--	--		--	0.000010	--	0.000010	
			Chemical Total	--	2E-11	--	--	2E-11		--	0.00001	--	0.00001	
			Exposure Point Total											
Exposure Medium Total													0.00001	
Medium Total													0.007	
Receptor Total			Receptor Risk Total					Receptor HI Total					0.01	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--					
			Arsenic	8E-07	--	3E-07	--	1E-06					
			Manganese	--	--	--	--	--					
			Chemical Total	8E-07	--	3E-07	--	1E-06					
		Exposure Point Total					1E-06						
		Exposure Medium Total					1E-06						
	Air	North Waterfront	Aluminum	--	--	--	--	--					
			Arsenic	--	2E-11	--	--	2E-11					
			Manganese	--	--	--	--	--					
			Chemical Total	--	2E-11	--	--	2E-11					
		Exposure Point Total					2E-11						
		Exposure Medium Total					2E-11						
Medium Total							1E-06						
Subsurface Soil	Subsurface Soil	North Waterfront	Arsenic	1E-06	--	3E-07	--	1E-06					
			Manganese	--	--	--	--	--					
			Chemical Total	1E-06	--	3E-07	--	1E-06					
			Exposure Point Total					1E-06					
		Exposure Medium Total					1E-06						
		Air	North Waterfront	Arsenic	--	3E-11	--	--	3E-11				
	Manganese			--	--	--	--	--					
	Chemical Total			--	3E-11	--	--	3E-11					
	Exposure Point Total						3E-11						
	Exposure Medium Total					3E-11							
Medium Total							1E-06						
Receptor Total				Receptor Risk Total			2E-06						

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	0.006	--	--	0.006	
			Arsenic	3E-06	--	6E-07	--	4E-06		0.02	--	0.004	0.02	
			Manganese	--	--	--	--	--		0.01	--	--	0.01	
			Chemical Total	3E-06	--	6E-07	--	4E-06		0.04	--	0.004	0.04	
		Exposure Point Total												
		Exposure Medium Total												
	Air	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	--	0.00003	--	0.00003	
			Arsenic	--	2E-10	--	--	2E-10		--	0.000008	--	0.000008	
			Manganese	--	--	--	--	--		--	0.0001	--	0.0001	
			Chemical Total	--	2E-10	--	--	2E-10		--	0.0001	--	0.0001	
		Exposure Point Total												
		Exposure Medium Total												
Medium Total														
Subsurface Soil	Subsurface Soil	North Waterfront	Arsenic	4E-06	--	7E-07	--	4E-06	Skin, CVS CNS	0.02	--	0.005	0.03	
			Manganese	--	--	--	--	--		0.01	--	--	0.01	
			Chemical Total	4E-06	--	7E-07	--	4E-06		0.03	--	0.005	0.04	
			Exposure Point Total											
		Exposure Medium Total												
		Air	North Waterfront	Arsenic	--	2E-10	--	--	2E-10	Skin, CVS CNS	--	0.000010	--	0.000010
	Manganese			--	--	--	--	--	--		0.0001	--	0.0001	
	Chemical Total			--	2E-10	--	--	2E-10	--		0.0001	--	0.0001	
	Exposure Point Total													
	Exposure Medium Total													
	Medium Total													
	Receptor Total			Receptor Risk Total					Receptor HI Total					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	0.01	--	--	0.01	
			Arsenic	2E-07	--	2E-08	--	2E-07		0.03	--	0.003	0.04	
			Manganese	--	--	--	--	--		0.02	--	--	0.02	
			Chemical Total	2E-07	--	2E-08	--	2E-07		0.06	--	0.003	0.06	
		Exposure Point Total											0.06	
		Exposure Medium Total											0.06	
	Air	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	--	0.1	--	0.1	
			Arsenic	--	3E-08	--	--	3E-08		--	0.03	--	0.03	
			Manganese	--	--	--	--	--		--	0.4	--	0.4	
			Chemical Total	--	3E-08	--	--	3E-08		--	0.6	--	0.6	
		Exposure Point Total											0.6	
		Exposure Medium Total											0.6	
Medium Total													0.6	
Subsurface Soil	Subsurface Soil	North Waterfront	Arsenic	3E-07	--	2E-08	--	3E-07	Skin, CVS CNS	0.04	--	0.004	0.04	
			Manganese	--	--	--	--	--		0.02	--	--	0.02	
			Chemical Total	3E-07	--	2E-08	--	3E-07		0.06	--	0.004	0.06	
			Exposure Point Total											0.06
		Exposure Medium Total											0.06	
		Air	North Waterfront	Arsenic	--	4E-08	--	--	4E-08	Skin, CVS CNS	--	0.04	--	0.04
	Manganese			--	--	--	--	--	--		0.4	--	0.4	
	Chemical Total			--	4E-08	--	--	4E-08	--		0.5	--	0.5	
	Exposure Point Total											0.5		
	Exposure Medium Total											0.5		
Medium Total													0.5	
Receptor Total				Receptor Risk Total					6E-07	Receptor HI Total				1

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient										
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total						
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	0.08	--	--	0.08						
			Arsenic	9E-06	--	8E-07	--	1E-05		0.2	--	0.02	0.3						
			Manganese	--	--	--	--	--		0.1	--	--	0.1						
			Chemical Total	9E-06	--	8E-07	--	1E-05		0.5	--	0.02	0.5						
		Exposure Point Total												0.5					
														0.5					
		Exposure Medium Total												0.5					
														0.5					
	Air	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	--	0.0001	--	0.0001						
			Arsenic	--	2E-10	--	--	2E-10		--	0.00003	--	0.00003						
			Manganese	--	--	--	--	--		--	0.0004	--	0.0004						
			Chemical Total	--	2E-10	--	--	2E-10		--	0.0006	--	0.0006						
		Exposure Point Total												0.0006					
														0.0006					
		Exposure Medium Total												0.0006					
														0.0006					
Medium Total													0.5						
Subsurface Soil	Subsurface Soil	North Waterfront	Arsenic	1E-05	--	1E-06	--	1E-05	Skin, CVS CNS	0.3	--	0.03	0.3						
			Manganese	--	--	--	--	--		0.1	--	--	0.1						
			Chemical Total	1E-05	--	1E-06	--	1E-05		0.4	--	0.03	0.5						
			Exposure Point Total												0.5				
														0.5					
		Exposure Medium Total												0.5					
														0.5					
		Air	North Waterfront	Arsenic	--	2E-10	--	--	2E-10	Skin, CVS CNS	--	0.00004	--	0.00004					
	Manganese			--	--	--	--	--	--		0.0004	--	0.0004						
	Chemical Total			--	2E-10	--	--	2E-10	--		0.0005	--	0.0005						
	Exposure Point Total												0.0005						
													0.0005						
	Exposure Medium Total												0.0005						
													0.0005						
	Medium Total													0.5					
	Receptor Total								Receptor Risk Total					2E-05	Receptor HI Total				

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	0.009	--	--	0.009	
			Arsenic	4E-06	--	5E-07	--	5E-06		0.03	--	0.003	0.03	
			Manganese	--	--	--	--	--		0.01	--	--	0.01	
			Chemical Total	4E-06	--	5E-07	--	5E-06		0.05	--	0.003	0.05	
	Exposure Point Total			5E-06					0.05					
	Exposure Medium Total			5E-06					0.05					
	Air	North Waterfront	Aluminum	--	--	--	--	--	CNS Skin, CVS CNS	--	0.0001	--	0.0001	
			Arsenic	--	7E-10	--	--	7E-10		--	0.00003	--	0.00003	
			Manganese	--	--	--	--	--		--	0.0004	--	0.0004	
			Chemical Total	--	7E-10	--	--	7E-10		--	0.0006	--	0.0006	
	Exposure Point Total			7E-10					0.0006					
	Exposure Medium Total			7E-10					0.0006					
Medium Total				5E-06					0.05					
Subsurface Soil	Subsurface Soil	North Waterfront	Arsenic	5E-06	--	6E-07	--	6E-06	Skin, CVS CNS	0.03	--	0.004	0.04	
			Manganese	--	--	--	--	--		0.01	--	--	0.01	
			Chemical Total	5E-06	--	6E-07	--	6E-06		0.05	--	0.004	0.05	
			Exposure Point Total	6E-06						0.05				
	Exposure Medium Total			6E-06					0.05					
	Air	North Waterfront	Arsenic	--	9E-10	--	--	9E-10	Skin, CVS CNS	--	0.00004	--	0.00004	
			Manganese	--	--	--	--	--		--	0.0004	--	0.0004	
			Chemical Total	--	9E-10	--	--	9E-10		--	0.0005	--	0.0005	
			Exposure Point Total	9E-10						0.0005				
	Exposure Medium Total			9E-10					0.0005					
Medium Total				6E-06					0.05					
Receptor Total				Receptor Risk Total					Receptor HI Total					0.1

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.12.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	North Waterfront	Aluminum	--	--	--	--	--					
			Arsenic	1E-05	--	1E-06	--	1E-05					
			Manganese	--	--	--	--	--					
			Chemical Total	1E-05	--	1E-06	--	1E-05					
	Exposure Point Total								1E-05				
	Exposure Medium Total								1E-05				
	Air	North Waterfront	Aluminum	--	--	--	--	--					
			Arsenic	--	9E-10	--	--	9E-10					
			Manganese	--	--	--	--	--					
			Chemical Total	--	9E-10	--	--	9E-10					
Exposure Point Total								9E-10					
Exposure Medium Total								9E-10					
Medium Total								1E-05					
Subsurface Soil	Subsurface Soil	North Waterfront	Arsenic	2E-05	--	2E-06	--	2E-05					
			Manganese	--	--	--	--	--					
			Chemical Total	2E-05	--	2E-06	--	2E-05					
			Exposure Point Total										
	Exposure Medium Total								2E-05				
	Air	North Waterfront	Arsenic	--	1E-09	--	--	1E-09					
			Manganese	--	--	--	--	--					
			Chemical Total	--	1E-09	--	--	1E-09					
			Exposure Point Total										
	Exposure Medium Total								1E-09				
Medium Total								2E-05					
Receptor Total			Receptor Risk Total					3E-05					

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Central Shipyard

LIST OF TABLES
RAGS PART D TABLE 9 - CENTRAL SHIPYARD
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

9.1.RME	Current Adolescent Trespassers - Central Shipyard
9.2.RME	Current Adult Trespassers - Central Shipyard
9.3.RME	Current Industrial Workers - Central Shipyard
9.4.RME	Future Adolescent Trespassers - Central Shipyard
9.5.RME	Future Adult Trespassers - Central Shipyard
9.6.RME	Future Industrial Workers - Central Shipyard
9.7.RME	Current/Future Construction Workers - North Waterfront
9.8.RME	Hypothetical Child Residents - Central Shipyard
9.9.RME	Hypothetical Adult Residents - Central Shipyard

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.003	--	--	0.003	
			Chemical Total	--	--	--	--	--		0.003	--	--	0.003	
			Exposure Point Total					--					0.003	
		Exposure Medium Total						--					0.003	
	Air	Central Shipyard	Aluminum	--	--	--	--	--	CNS	--	0.000005	--	0.000005	
			Chemical Total	--	--	--	--	--		--	0.000005	--	0.000005	
			Exposure Point Total					--					0.000005	
		Exposure Medium Total						--					0.000005	
	Medium Total								--				0.003	
	Receptor Total								--				0.003	
				Receptor Risk Total					--	Receptor HI Total				0.003

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.002	--	--	0.002
			Chemical Total	--	--	--	--			0.002	--	--	0.002
			Exposure Point Total										0.002
			Exposure Medium Total										0.002
	Air	Central Shipyard	Aluminum	--	--	--	--	--	CNS	--	0.000005	--	0.000005
			Chemical Total	--	--	--	--			--	0.000005	--	0.000005
			Exposure Point Total										0.000005
			Exposure Medium Total										0.000005
	Medium Total												0.002
	Receptor Total			Receptor Risk Total					--	Receptor HI Total			0.002

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.01	--	--	0.01
			Chemical Total	--	--	--	--			0.01	--	--	0.01
			Exposure Point Total										
			Exposure Medium Total										
	Air	Central Shipyard	Aluminum	--	--	--	--	--	CNS	--	0.00005	--	0.00005
			Chemical Total	--	--	--	--			--	0.00005	--	0.00005
			Exposure Point Total										
			Exposure Medium Total										
Medium Total													
Receptor Total				Receptor Risk Total						Receptor HI Total			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.003	--	--	0.003	
			Chemical Total	--	--	--	--			0.003	--	--	0.003	
			Exposure Point Total										0.003	
		Exposure Medium Total											0.003	
	Air	Central Shipyard	Aluminum	--	--	--	--	--	CNS	--	0.000005	--	0.000005	
			Chemical Total	--	--	--	--			--	0.000005	--	0.000005	
			Exposure Point Total										0.000005	
		Exposure Medium Total											0.000005	
	Medium Total													0.003
	Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese	--	--	--	--	--	CNS	0.004	--	--	0.004
			Chemical Total	--	--	--	--		0.004		--	--	0.004	
			Exposure Point Total										0.004	
Exposure Medium Total												0.004		
Air		Central Shipyard	Manganese	--	--	--	--	--	CNS	--	0.00002	--	0.00002	
			Chemical Total	--	--	--	--			--	0.00002	--	0.00002	
			Exposure Point Total										0.00002	
		Exposure Medium Total											0.00002	
Medium Total													0.004	
Receptor Total				Receptor Risk Total					--	Receptor HI Total				0.008

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.002	--	--	0.002	
			Chemical Total	--	--	--	--			0.002	--	--	0.002	
		Exposure Point Total											0.002	
		Exposure Medium Total											0.002	
	Air	Central Shipyard	Aluminum	--	--	--	--	--	CNS	--	0.000005	--	0.000005	
			Chemical Total	--	--	--	--			--	0.000005	--	0.000005	
		Exposure Point Total											0.000005	
		Exposure Medium Total											0.000005	
	Medium Total													0.002
	Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese	--	--	--	--	--	CNS	0.003	--	--	0.003
			Chemical Total	--	--	--	--		0.003		--	--	0.003	
Exposure Point Total												0.003		
Exposure Medium Total												0.003		
Air		Central Shipyard	Manganese	--	--	--	--	--	CNS	--	0.00002	--	0.00002	
			Chemical Total	--	--	--	--			--	0.00002	--	0.00002	
		Exposure Point Total											0.00002	
		Exposure Medium Total											0.00002	
Medium Total													0.003	
Receptor Total				Receptor Risk Total					--	Receptor HI Total				0.005

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.01	--	--	0.01	
			Chemical Total	--	--	--	--			0.01	--	--	0.01	
			Exposure Point Total											
		Exposure Medium Total												
	Air	Central Shipyard	Aluminum	--	--	--	--	--	CNS	--	0.00005	--	0.00005	
			Chemical Total	--	--	--	--			--	0.00005	--	0.00005	
			Exposure Point Total											
		Exposure Medium Total												
	Medium Total													
	Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese	--	--	--	--	--	CNS	0.02	--	--	0.02
			Chemical Total	--	--	--	--		0.02		--	--	0.02	
			Exposure Point Total											
Exposure Medium Total														
Air		Central Shipyard	Manganese	--	--	--	--	--	CNS	--	0.0002	--	0.0002	
			Chemical Total	--	--	--	--			--	0.0002	--	0.0002	
			Exposure Point Total											
		Exposure Medium Total												
Medium Total														
Receptor Total				Receptor Risk Total					--	Receptor HI Total				
										0.03				

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.02	--	--	0.02
			Chemical Total	--	--	--	--			0.02	--	--	0.02
		Exposure Point Total											
		Exposure Medium Total											
	Air	Central Shipyard	Aluminum	--	--	--	--	--	CNS	--	0.2	--	0.2
			Chemical Total	--	--	--	--			--	0.2	--	0.2
		Exposure Point Total											
		Exposure Medium Total											
	Medium Total												
	Subsurface Soil												
Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese	--	--	--	--	--	CNS	0.03	--	--	0.03
			Chemical Total	--	--	--	--			0.03	--	--	0.03
		Exposure Point Total											
		Exposure Medium Total											
	Air	Central Shipyard	Manganese	--	--	--	--	--	CNS	--	0.6	--	0.6
			Chemical Total	--	--	--	--			--	0.6	--	0.6
		Exposure Point Total											
		Exposure Medium Total											
	Medium Total												
	Receptor Total			Receptor Risk Total					--	Receptor HI Total			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.8 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.2	--	--	0.2
			Chemical Total	--	--	--	--			0.2	--	--	0.2
		Exposure Point Total										0.2	
		Exposure Medium Total										0.2	
	Air	Central Shipyard	Aluminum	--	--	--	--	--	CNS	--	0.0002	--	0.0002
			Chemical Total	--	--	--	--			--	0.0002	--	0.0002
		Exposure Point Total										0.0002	
		Exposure Medium Total										0.0002	
	Medium Total												0.2
	Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese	--	--	--	--	--	CNS	0.2	--	--
			Chemical Total	--	--	--	--		0.2		--	--	0.2
Exposure Point Total											0.2		
Exposure Medium Total											0.2		
Air		Central Shipyard	Manganese	--	--	--	--	--	CNS	--	0.0007	--	0.0007
			Chemical Total	--	--	--	--			--	0.0007	--	0.0007
		Exposure Point Total										0.0007	
		Exposure Medium Total										0.0007	
Medium Total												0.2	
Receptor Total				Receptor Risk Total					--	Receptor HI Total			0.4

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Central Shipyard	Aluminum	--	--	--	--	--	CNS	0.02	--	--	0.02	
			Chemical Total	--	--	--	--	--		0.02	--	--	0.02	
			Exposure Point Total										0.02	
			Exposure Medium Total										0.02	
	Air	Central Shipyard	Aluminum	--	--	--	--	--	CNS	--	0.0002	--	0.0002	
			Chemical Total	--	--	--	--	--		--	0.0002	--	0.0002	
			Exposure Point Total										0.0002	
			Exposure Medium Total										0.0002	
Medium Total													0.02	
Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese	--	--	--	--	--	CNS	0.02	--	--	0.02	
			Chemical Total	--	--	--	--	--		0.02	--	--	0.02	
			Exposure Point Total										0.02	
			Exposure Medium Total										0.02	
	Air	Central Shipyard	Manganese	--	--	--	--	--	CNS	--	0.0007	--	0.0007	
			Chemical Total	--	--	--	--	--		--	0.0007	--	0.0007	
			Exposure Point Total										0.0007	
			Exposure Medium Total										0.0007	
Medium Total													0.02	
Receptor Total				Receptor Risk Total					--	Receptor HI Total				0.04

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient							
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total			
Surface Soil	Surface Soil	Central Shipyard	Aluminum	--	--	--	--	--								
			Chemical Total	--	--	--	--									
		Exposure Point Total					--									
	Exposure Medium Total							--								
	Air	Central Shipyard	Aluminum	--	--	--	--	--								
			Chemical Total	--	--	--	--									
		Exposure Point Total					--									
	Exposure Medium Total							--								
Medium Total								--								
Subsurface Soil	Subsurface Soil	Central Shipyard	Manganese	--	--	--	--	--								
			Chemical Total	--	--	--	--									
		Exposure Point Total					--									
	Exposure Medium Total							--								
	Air	Central Shipyard	Manganese	--	--	--	--	--								
			Chemical Total	--	--	--	--									
		Exposure Point Total					--									
	Exposure Medium Total							--								
Medium Total								--								
Receptor Total								--								

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Former Building 234

LIST OF TABLES
RAGS PART D TABLE 9 - FORMER BUILDING 234
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

9.1.RME	Current Adolescent Trespassers - Former Building 234
9.2.RME	Current Adult Trespassers - Former Building 234
9.3.RME	Current Industrial Workers - Former Building 234
9.4.RME	Future Adolescent Trespassers - Former Building 234
9.5.RME	Future Adult Trespassers - Former Building 234
9.6.RME	Future Industrial Workers - Former Building 234
9.7.RME	Current/Future Construction Workers - North Waterfront
9.8.RME	Hypothetical Child Residents - Former Building 234
9.9.RME	Hypothetical Adult Residents - Former Building 234

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum	--	--	--	--	--	CNS	0.003	--	--	0.003
			Chemical Total	--	--	--	--			0.003	--	--	0.003
		Exposure Point Total		--					0.003				
		Exposure Medium Total		--					0.003				
	Air	Former Building 234	Aluminum	--	--	--	--	--	CNS	--	0.000004	--	0.000004
			Chemical Total	--	--	--	--			--	0.000004	--	0.000004
		Exposure Point Total		--					0.000004				
		Exposure Medium Total		--					0.000004				
	Medium Total				--					0.003			
	Receptor Total				Receptor Risk Total					Receptor HI Total			
				--					0.003				

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	Former Building 234	Aluminum	--	--	--	--	--	CNS	0.002	--	--	0.002	
			Chemical Total	--	--	--	--			0.002	--	--	0.002	
		Exposure Point Total											0.002	
		Exposure Medium Total											0.002	
	Air	Former Building 234	Aluminum	--	--	--	--	--	CNS	--	0.000004	--	0.000004	
			Chemical Total	--	--	--	--			--	0.000004	--	0.000004	
		Exposure Point Total											0.000004	
		Exposure Medium Total											0.000004	
Medium Total													0.002	
Receptor Total				Receptor Risk Total					--	Receptor HI Total				0.002

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum	--	--	--	--	--	CNS	0.010	--	--	0.010
			Chemical Total	--	--	--	--	--		0.010	--	--	0.010
			Exposure Point Total										0.010
		Exposure Medium Total						--					0.010
	Air	Former Building 234	Aluminum	--	--	--	--	--	CNS	--	0.00004	--	0.00004
			Chemical Total	--	--	--	--	--		--	0.00004	--	0.00004
			Exposure Point Total					--					0.00004
		Exposure Medium Total						--					0.00004
	Medium Total							--					0.01
	Receptor Total							--					0.01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum	--	--	--	--	--	CNS	0.003	--	--	0.003
			Chemical Total	--	--	--	--			0.003	--	--	0.003
		Exposure Point Total											
		Exposure Medium Total											
	Air	Former Building 234	Aluminum	--	--	--	--	--	CNS	--	0.000004	--	0.000004
			Chemical Total	--	--	--	--			--	0.000004	--	0.000004
		Exposure Point Total											
		Exposure Medium Total											
Medium Total													
Receptor Total				Receptor Risk Total					--	Receptor HI Total			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum	--	--	--	--	--	CNS	0.002	--	--	0.002
			Chemical Total	--	--	--	--			0.002	--	--	0.002
		Exposure Point Total											0.002
		Exposure Medium Total											0.002
	Air	Former Building 234	Aluminum	--	--	--	--	--	CNS	--	0.000004	--	0.000004
			Chemical Total	--	--	--	--			--	0.000004	--	0.000004
		Exposure Point Total											0.000004
		Exposure Medium Total											0.000004
	Medium Total												0.002
	Receptor Total			Receptor Risk Total					--	Receptor HI Total			0.002

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum	--	--	--	--	--	CNS	0.009	--	--	0.009
			Chemical Total	--	--	--	--	--		0.009	--	--	0.009
		Exposure Point Total											
		Exposure Medium Total											
	Air	Former Building 234	Aluminum	--	--	--	--	--	CNS	--	0.00004	--	0.00004
			Chemical Total	--	--	--	--	--		--	0.00004	--	0.00004
		Exposure Point Total											
		Exposure Medium Total											
	Medium Total												
	Receptor Total			Receptor Risk Total					--	Receptor HI Total			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum	--	--	--	--	--	CNS	0.02	--	--	0.02
			Chemical Total	--	--	--	--	--		0.02	--	--	0.02
		Exposure Point Total											
		Exposure Medium Total											
	Air	Former Building 234	Aluminum	--	--	--	--	--	CNS	--	0.2	--	0.2
			Chemical Total	--	--	--	--	--		--	0.2	--	0.2
		Exposure Point Total											
		Exposure Medium Total											
	Medium Total												
	Receptor Total			Receptor Risk Total					--	Receptor HI Total			
								--	0.2				

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum	--	--	--	--	--	CNS	0.1	--	--	0.1
			Chemical Total	--	--	--	--			0.1	--	--	0.1
			Exposure Point Total										
			Exposure Medium Total										
	Air	Former Building 234	Aluminum	--	--	--	--	--	CNS	--	0.0002	--	0.0002
			Chemical Total	--	--	--	--			--	0.0002	--	0.0002
			Exposure Point Total										
			Exposure Medium Total										
	Medium Total												
	Receptor Total												

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Former Building 234	Aluminum	--	--	--	--	--	CNS	0.01	--	--	0.01
			Chemical Total	--	--	--	--			0.01	--	--	0.01
			Exposure Point Total										
			Exposure Medium Total										
	Air	Former Building 234	Aluminum	--	--	--	--	--	CNS	--	0.0002	--	0.0002
			Chemical Total	--	--	--	--			--	0.0002	--	0.0002
			Exposure Point Total										
			Exposure Medium Total										
	Medium Total												
	Receptor Total			Receptor Risk Total					--	Receptor HI Total			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

South Waterfront

LIST OF TABLES
RAGS PART D TABLE 9 - SOUTH WATERFRONT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

9.1.RME	Future Adolescent Trespassers - South Waterfront
9.2.RME	Future Adult Trespassers - South Waterfront
9.3.RME	Future Industrial Workers - South Waterfront
9.4.RME	Current/Future Construction Workers - North Waterfront
9.5.RME	Hypothetical Child Residents - South Waterfront
9.6.RME	Hypothetical Adult Residents - South Waterfront

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese	--	--	--	--	--	CNS	0.008	--	--	0.008
			Chemical Total	--	--	--	--			0.008	--	--	0.008
		Exposure Point Total											0.008
		Exposure Medium Total											0.008
	Air	South Waterfront	Manganese	--	--	--	--	--	CNS	--	0.00003	--	0.00003
			Chemical Total	--	--	--	--			--	0.00003	--	0.00003
		Exposure Point Total											0.00003
		Exposure Medium Total											0.00003
Medium Total													0.008
Receptor Total				Receptor Risk Total					--	Receptor HI Total			0.008

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese	--	--	--	--	--	CNS	0.005	--	--	0.005
			Chemical Total	--	--	--	--			0.005	--	--	0.005
		Exposure Point Total											0.005
		Exposure Medium Total											0.005
	Air	South Waterfront	Manganese	--	--	--	--	--	CNS	--	0.00003	--	0.00003
			Chemical Total	--	--	--	--			--	0.00003	--	0.00003
		Exposure Point Total											0.00003
		Exposure Medium Total											0.00003
	Medium Total												0.005
	Receptor Total			Receptor Risk Total					--	Receptor HI Total			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese	--	--	--	--	--	CNS	0.03	--	--	0.03
			Chemical Total	--	--	--	--			0.03	--	--	0.03
			Exposure Point Total										0.03
			Exposure Medium Total										0.03
	Air	South Waterfront	Manganese	--	--	--	--	--	CNS	--	0.0003	--	0.0003
			Chemical Total	--	--	--	--			--	0.0003	--	0.0003
			Exposure Point Total										0.0003
			Exposure Medium Total										0.0003
			Medium Total										0.03
			Receptor Total	Receptor Risk Total					--		Receptor HI Total		

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese	--	--	--	--	--	CNS	0.05	--	--	0.05
			Chemical Total	--	--	--	--			0.05	--	--	0.05
			Exposure Point Total										0.05
			Exposure Medium Total										0.05
	Air	South Waterfront	Manganese	--	--	--	--	--	CNS	--	1	--	1
			Chemical Total	--	--	--	--			--	1	--	1
			Exposure Point Total										1
			Exposure Medium Total										1
	Medium Total												1
	Receptor Total												1
			Receptor Risk Total					--	Receptor HI Total				1

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese	--	--	--	--	--	CNS	0.4	--	--	0.4
			Chemical Total	--	--	--	--	--		0.4	--	--	0.4
			Exposure Point Total	--	--	--	--	--					0.4
		Exposure Medium Total		--	--	--	--	--					0.4
	Air	South Waterfront	Manganese	--	--	--	--	--	CNS	--	0.001	--	0.001
			Chemical Total	--	--	--	--	--		--	0.001	--	0.001
			Exposure Point Total	--	--	--	--	--					0.001
		Exposure Medium Total		--	--	--	--	--					0.001
	Medium Total			--	--	--	--	--					0.4
	Receptor Total			Receptor Risk Total					--	Receptor HI Total			0.4

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Hypothetical
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	South Waterfront	Manganese	--	--	--	--	--	CNS	0.04	--	--	0.04
			Chemical Total	--	--	--	--			0.04	--	--	0.04
			Exposure Point Total										
			Exposure Medium Total										
	Air	South Waterfront	Manganese	--	--	--	--	--	CNS	--	0.001	--	0.001
			Chemical Total	--	--	--	--			--	0.001	--	0.001
			Exposure Point Total										
			Exposure Medium Total										
	Medium Total												
	Receptor Total			Receptor Risk Total						Receptor HI Total			

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

PCB Removal Area

LIST OF TABLES
RAGS PART D TABLE 9 - PCB REMOVAL AREA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

9.1.RME	Current Adolescent Trespassers - PCB Removal Area
9.2.RME	Current Adult Trespassers - PCB Removal Area
9.3.RME	Current Lifelong Trespassers - PCB Removal Area
9.4.RME	Current Industrial Workers - PCB Removal Area
9.5.RME	Future Adolescent Trespassers - PCB Removal Area
9.6.RME	Future Adult Trespassers - PCB Removal Area
9.7.RME	Future Lifelong Trespassers - PCB Removal Area
9.8.RME	Future Industrial Workers - PCB Removal Area
9.9.RME	Current/Future Construction Workers - North Waterfront
9.10.RME	Hypothetical Child Residents - PCB Removal Area
9.11.RME	Hypothetical Adult Residents - PCB Removal Area
9.12.RME	Hypothetical Lifelong Residents - PCB Removal Area

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--	CNS	0.003	--	--	0.003
			Chromium	9E-07	--	--	--	9E-07		0.001	--	--	0.001
			Chemical Total	9E-07	--	--	--	9E-07		0.005	--	--	0.005
		Exposure Point Total											0.005
	Exposure Medium Total											0.005	
	Air	PCB Removal Area	Aluminum	--	--	--	--	--	CNS Respiratory	--	0.000005	--	0.000005
			Chromium	--	1E-09	--	--	1E-09		--	0.000003	--	0.000003
			Chemical Total	--	1E-09	--	--	1E-09		--	0.000005	--	0.000005
		Exposure Point Total											0.000005
	Exposure Medium Total											0.000005	
Medium Total											0.005		
Receptor Total		Receptor Risk Total						9E-07	Receptor HI Total			0.005	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--	CNS None Specified	0.002	--	--	0.002
			Chromium	4E-07	--	--	--	4E-07		0.0010	--	--	0.0010
			Chemical Total	4E-07	--	--	--	4E-07		0.003	--	--	0.003
		Exposure Point Total						4E-07					0.003
		Exposure Medium Total						4E-07					0.003
	Air	PCB Removal Area	Aluminum	--	--	--	--	--	CNS Respiratory	--	0.000005	--	0.000005
			Chromium	--	8E-10	--	--	8E-10		--	0.0000003	--	0.0000003
			Chemical Total	--	8E-10	--	--	8E-10		--	0.000005	--	0.000005
		Exposure Point Total						8E-10					0.000005
		Exposure Medium Total						8E-10					0.000005
Medium Total								4E-07					0.003
Receptor Total								4E-07					0.003

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--							
			Chromium	1E-06	--	--	--	1E-06							
			Chemical Total	1E-06	--	--	--	1E-06							
		Exposure Point Total					1E-06								
	Exposure Medium Total							1E-06							
	Air	PCB Removal Area	Aluminum	--	--	--	--	--							
			Chromium	--	2E-09	--	--	2E-09							
			Chemical Total	--	2E-09	--	--	2E-09							
		Exposure Point Total					2E-09								
	Exposure Medium Total							2E-09							
Medium Total							1E-06								
Receptor Total							1E-06								
			Receptor Risk Total					1E-06							

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--	CNS	0.01	--	--	0.01		
			Chromium	3E-06	--	--	--	3E-06		0.005	--	--	0.005		
			Chemical Total	3E-06	--	--	--	3E-06		0.02	--	--	0.02		
		Exposure Point Total						3E-06						0.02	
		Exposure Medium Total						3E-06						0.02	
	Air	PCB Removal Area	Aluminum	--	--	--	--	--	CNS Respiratory	--	0.00005	--	0.00005		
			Chromium	--	1E-08	--	--	1E-08		--	0.000003	--	0.000003		
			Chemical Total	--	1E-08	--	--	1E-08		--	0.00005	--	0.00005		
		Exposure Point Total						1E-08						0.00005	
		Exposure Medium Total						1E-08						0.00005	
Medium Total									3E-06						0.02
Receptor Total				Receptor Risk Total					3E-06	Receptor HI Total					0.02

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--	CNS None Specified	0.003	--	--	0.003	
			Chromium	9E-07	--	--	--	9E-07		0.001	--	--	0.001	
			Chemical Total	9E-07	--	--	--	9E-07		0.005	--	--	0.005	
			Exposure Point Total										0.005	
		Exposure Medium Total												0.005
	Air	PCB Removal Area	Aluminum	--	--	--	--	--	CNS Respiratory	--	0.000005	--	0.000005	
			Chromium	--	1E-09	--	--	1E-09		--	0.0000003	--	0.0000003	
			Chemical Total	--	1E-09	--	--	1E-09		--	0.000005	--	0.000005	
			Exposure Point Total										0.000005	
		Exposure Medium Total												0.000005
Medium Total														0.005
Receptor Total				Receptor Risk Total					Receptor HI Total					0.005

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--	CNS None Specified	0.002	--	--	0.002
			Chromium	4E-07	--	--	--	4E-07		0.0010	--	--	0.0010
			Chemical Total	4E-07	--	--	--	4E-07		0.003	--	--	0.003
		Exposure Point Total					4E-07					0.003	
	Exposure Medium Total							4E-07				0.003	
	Air	PCB Removal Area	Aluminum	--	--	--	--	--	CNS Respiratory	--	0.000005	--	0.000005
			Chromium	--	8E-10	--	--	8E-10		--	0.0000003	--	0.0000003
			Chemical Total	--	8E-10	--	--	8E-10		--	0.000005	--	0.000005
		Exposure Point Total					8E-10					0.000005	
	Exposure Medium Total							8E-10				0.000005	
Medium Total							4E-07				0.003		
Receptor Total							4E-07				0.003		
			Receptor Risk Total					4E-07	Receptor HI Total				0.003

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--							
			Chromium	1E-06	--	--	--	1E-06							
			Chemical Total	1E-06	--	--	--	1E-06							
		Exposure Point Total													1E-06
		Exposure Medium Total													1E-06
	Air	PCB Removal Area	Aluminum	--	--	--	--	--							
			Chromium	--	2E-09	--	--	2E-09							
			Chemical Total	--	2E-09	--	--	2E-09							
		Exposure Point Total													2E-09
		Exposure Medium Total													2E-09
Medium Total								1E-06							
Receptor Total								1E-06							

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 OF 1

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--	CNS None Specified	0.01	--	--	0.01
			Chromium	3E-06	--	--	--	3E-06		0.005	--	--	0.005
			Chemical Total	3E-06	--	--	--	3E-06		0.02	--	--	0.02
		Exposure Point Total					3E-06					0.02	
	Exposure Medium Total							3E-06				0.02	
	Air	PCB Removal Area	Aluminum	--	--	--	--	--	CNS Respiratory	--	0.00005	--	0.00005
			Chromium	--	1E-08	--	--	1E-08		--	0.000003	--	0.000003
			Chemical Total	--	1E-08	--	--	1E-08		--	0.00005	--	0.00005
		Exposure Point Total					1E-08					0.00005	
	Exposure Medium Total							1E-08				0.00005	
Medium Total							3E-06				0.02		
Receptor Total							Receptor Risk Total	3E-06			Receptor HI Total	0.02	

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--	CNS None Specified	0.02	--	--	0.02	
			Chromium	2E-07	--	--	--	2E-07		0.001	--	--	0.001	
			Chemical Total	2E-07	--	--	--	2E-07		0.02	--	--	0.02	
		Exposure Point Total						2E-07						0.02
		Exposure Medium Total						2E-07					0.02	
	Air	PCB Removal Area	Aluminum	--	--	--	--	--	CNS Respiratory	--	0.2	--	0.2	
			Chromium	--	2E-06	--	--	2E-06		--	0.01	--	0.01	
			Chemical Total	--	2E-06	--	--	2E-06		--	0.2	--	0.2	
		Exposure Point Total						2E-06						0.2
		Exposure Medium Total						2E-06					0.2	
Medium Total									2E-06					0.2
Receptor Total									2E-06					0.2
				Receptor Risk Total					2E-06	Receptor HI Total				0.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--	CNS None Specified	0.2	--	--	0.2
			Chromium	5E-05	--	--	--	5E-05		0.07	--	--	0.07
			Chemical Total	5E-05	--	--	--	5E-05		0.2	--	--	0.2
		Exposure Point Total					5E-05					0.2	
	Exposure Medium Total							5E-05				0.2	
	Air	PCB Removal Area	Aluminum	--	--	--	--	--	CNS Respiratory	--	0.0002	--	0.0002
			Chromium	--	5E-08	--	--	5E-08		--	0.00001	--	0.00001
			Chemical Total	--	5E-08	--	--	5E-08		--	0.0002	--	0.0002
		Exposure Point Total					5E-08					0.0002	
	Exposure Medium Total							5E-08				0.0002	
Medium Total							5E-05				0.2		
Receptor Total			Receptor Risk Total				5E-05	Receptor HI Total				0.2	

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--	CNS None Specified	0.02	--	--	0.02
			Chromium	7E-06	--	--	--	7E-06		0.007	--	--	0.007
			Chemical Total	7E-06	--	--	--	7E-06		0.02	--	--	0.02
		Exposure Point Total								7E-06			
	Exposure Medium Total								7E-06				0.02
	Air	PCB Removal Area	Aluminum	--	--	--	--	--	CNS Respiratory	--	0.0002	--	0.0002
			Chromium	--	7E-08	--	--	7E-08		--	0.00001	--	0.00001
			Chemical Total	--	7E-08	--	--	7E-08		--	0.0002	--	0.0002
		Exposure Point Total								7E-08			
	Exposure Medium Total								7E-08				0.0002
Medium Total									7E-06				0.02
Receptor Total				Receptor Risk Total					7E-06	Receptor HI Total			0.02

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.12.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	PCB Removal Area	Aluminum	--	--	--	--	--					
			Chromium	5E-05	--	--	--	5E-05					
			Chemical Total	5E-05	--	--	--	5E-05					
		Exposure Point Total					5E-05						
		Exposure Medium Total					5E-05						
	Air	PCB Removal Area	Aluminum	--	--	--	--	--					
			Chromium	--	1E-07	--	--	1E-07					
			Chemical Total	--	1E-07	--	--	1E-07					
		Exposure Point Total					1E-07						
		Exposure Medium Total					1E-07						
Medium Total								5E-05					
Receptor Total								5E-05					
				Receptor Risk Total									

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

APPENDIX G
BACKGROUND ANALYSIS

Background Evaluation

Based on comments received from EPA and RIDEM and the discussions at the March 2012 RPM meeting, Navy utilized the NAVSTA Newport Basewide Background Study to establish a background dataset for metals in soil that were determined to be risk drivers or considered background based on the previous geochemical analysis that was conducted. Navy used the ProUCL software program to calculate the Upper Predictive Limit to be used as a background threshold value (BTV) for Site 19 – On-Shore Dorecktor Shipyard.

The EPA ProUCL Fact Sheet

(http://www.epa.gov/nerlesd1/tsc/ProUCL_v4.00.05/ProUCL_v4.0_Facts_Sheet.pdf) states:

ProUCL 4.0 can be used to compute several parametric and nonparametric upper limits that are used to estimate the BTVs or not-to-exceed values for data sets with NDs and without NDs. These upper limits include: upper prediction limits (UPLs), upper tolerance limits (UTLs), and upper percentiles. Some of the nonparametric methods such as the Kaplan-Meier (Meier, 1958) method and ROS methods are applicable on left-censored data sets having multiple detection limits. The background statistics as incorporated in ProUCL 4.0 are particularly useful when individual site observations from some impacted site areas (perhaps after some remediation activities) are to be compared with BTVs to determine if adequate amount of remediation and cleanup has been performed yielding remediated site concentrations comparable to background level concentrations; that is if the site concentrations can be considered as coming from (or approaching to) the population of background concentrations.

Navy will calculate UPLs from the base background dataset for all surface and subsurface soil types. The soil types were combined because the soil type at Site 19 is classified as urban fill and is likely a combination of different soil types from other portions of NAVSTA Newport. Table 1 presents the calculated UPL values for metals that were determined to be risk drivers or were considered within background levels by the geochemical analysis and the ProUCL output file.

In response to Navy's suggestion to use UPLs to establish background values, RIDEM requested that the arsenic values be adjusted. Based on RIDEM's evaluation of the background data for arsenic using the ProUCL software program, RIDEM requested that the Navy revise the UPLs for arsenic in the SASE Addendum to 13 mg/kg for surface soils and 20 mg/kg for subsurface soils. In surface soils, both Beach and Stissing Silt Loam were determined to be unrepresentative soil types for site-wide soil conditions. Beach soils were considered unrepresentative because concentrations of aluminum, arsenic, chromium, and cobalt were many times lower than concentrations observed in all other soil types. Stissing silt loam was considered unrepresentative due to elevated concentrations of arsenic, chromium, cobalt, and iron, as compared to other soil types. Several of these elevated concentrations were also determined to be outliers. Therefore, the value of 13 mg/kg for surface soil was calculated by eliminating Beach (Ba) and Stissing Silt Loam (Se) soils from the input to ProUCL.

In subsurface soils, Mansfield Mucky Silt Loam and Stissing Silt Loam were determined to be unrepresentative of site-wide soil conditions due to elevated concentrations of arsenic and cobalt, as compared to concentrations observed in other soil types. Therefore, the 20 mg/kg result for subsurface soils was determined by excluding the Mansfield Mucky Silt Loam (Ma) and Stissing Silt Loam (Se) background data. The following tables contain summary statistics for each of the soil types in the base background dataset.

SURFACE SOIL

Soil Type	Navy Proposed UPL (mg/kg)	Outlier Values (mg/kg)	With Outliers (mg/kg)			Without Outliers (mg/kg)		
			Mea n	Max	UPL	Mea n	Max	UPL
All soils	18	71.7; 23.5; 22.5	7.07	71.7	17.7	6.21	17.1	14.7
All except Beach and Stissing Silt Loam	18	22.5	6.59	22.5	13.9	6.39	17.1	13.2
Beach soils	18	none	1	1.3	1.29	1.00	1.3	1.29
Mansfield Mucky Silt Loam	18	22.5	7.05	22.5 0	16	6.24	13	12
Merrimack sandy loam	18	none	4.03	6	6.05	4.03	6	6.05
Newport silt loam	18	none	6.28	17.1	16.7	6.3	17.1	16.7
Pittstown silt loam	18	none	9.04	15	14.5	9.0	15	14.5
Stissing silt loam	18	71.7; 23.5	13	72	69.3	9.16	16.3	15.2

SUBSURFACE SOIL

Soil Type	Navy Proposed UPL (mg/kg)	Outlier Values (mg/kg)	With Outliers (mg/kg)			Without Outliers (mg/kg)		
			Mea n	Max	UPL	Mea n	Max	UPL
All soils	29	42.6; 38.7; 37.9	10.9	42.6	27.2	9.97	28.9	23.7
All except Mansfield and Stissing silt loams	29	none	7.87	23.5	20.5	7.9	23.5	20.5
Mansfield Mucky Silt Loam	29	none	16.5	42.6	37.8	16.5	42.6	37.8
Merrimack sandy loam	29	none	4	6.7	5.65	4	6.7	5.65
Newport silt loam	29	17.7	4.36	17.7	9.28	3.69	5.8	6.44
Pittstown silt loam	29	none	14.2	23.5	22.8	14.2	23.5	22.8
Stissing silt loam	29	none	16.4	27.3	31.4	16.4	27.3	31.4

RIDEM suggested that the Navy use UPLs of 13 mg/kg for surface soil and 20 mg/kg for subsurface soil for arsenic in the Draft Final SASE Addendum. Navy agreed with RIDEM's suggestion

Table 2
ProUCL Output

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Table 2
ProUCL Output

M MG/KG ALUMINUM (so_sb)											
General Statistics											
Total Number of Observations				100		Number of Distinct Observations				61	
Tolerance Factor				1.524							
Raw Statistics						Log-Transformed Statistics					
Minimum				5520		Minimum				8.616	
Maximum				14200		Maximum				9.561	
Second Largest				14000		Second Largest				9.547	
First Quartile				9248		First Quartile				9.132	
Median				10500		Median				9.259	
Third Quartile				11300		Third Quartile				9.333	
Mean				10315		Mean				9.229	
SD				1551		SD				0.159	
Coefficient of Variation				0.15							
Skewness				-0.229							
Background Statistics											
Normal Distribution Test						Lognormal Distribution Test					
Lilliefors Test Statistic				0.116		Lilliefors Test Statistic				0.146	
Lilliefors Critical Value				0.0886		Lilliefors Critical Value				0.0886	
Data not Normal at 5% Significance Level						Data not Lognormal at 5% Significance Level					
Assuming Normal Distribution						Assuming Lognormal Distribution					
95% UTL with 90% Coverage				12678		95% UTL with 90% Coverage				12978	
95% UPL (t)				12903		95% UPL (t)				13279	
90% Percentile (z)				12302		90% Percentile (z)				12489	
95% Percentile (z)				12866		95% Percentile (z)				13229	
99% Percentile (z)				13923		99% Percentile (z)				14738	
Gamma Distribution Test						Data Distribution Test					
k star				40.78		Data do not follow a Discernable Distribution (0.05)					
Theta Star				252.9							
MLE of Mean				10315							
MLE of Standard Deviation				1615							
nu star				8157							
A-D Test Statistic						Nonparametric Statistics					
5% A-D Critical Value				0.75		90% Percentile				12030	
K-S Test Statistic				0.137		95% Percentile				12625	
5% K-S Critical Value				0.0892		99% Percentile				14002	
Data not Gamma Distributed at 5% Significance Level											
Assuming Gamma Distribution						95% UTL with 90% Coverage					
90% Percentile				12431		95% Percentile Bootstrap UTL with 90% Coverage				12420	
95% Percentile				13107		95% BCA Bootstrap UTL with 90% Coverage				12420	
99% Percentile				14439		95% UPL				13075	
						95% Chebyshev UPL				17109	
95% WH Approx. Gamma UPL				13123		Upper Threshold Limit Based upon IQR				14379	
95% HW Approx. Gamma UPL				13159							
95% WH Approx. Gamma UTL with 90% Coverage				12854							
95% HW Approx. Gamma UTL with 90% Coverage				12882							
M MG/KG ALUMINUM (so_ss)											
General Statistics											
Total Number of Observations				115		Number of Distinct Observations				86	
Tolerance Factor				1.506							

Table 2
ProUCL Output

Raw Statistics				Log-Transformed Statistics			
Minimum		3710	Minimum		8.219		
Maximum		17900	Maximum		9.793		
Second Largest		17100	Second Largest		9.747		
First Quartile		9430	First Quartile		9.152		
Median		11000	Median		9.306		
Third Quartile		13550	Third Quartile		9.514		
Mean		11056	Mean		9.251		
SD		3335	SD		0.378		
Coefficient of Variation		0.302					
Skewness		-0.513					
Background Statistics							
Normal Distribution Test				Lognormal Distribution Test			
Lilliefors Test Statistic		0.106	Lilliefors Test Statistic		0.188		
Lilliefors Critical Value		0.0826	Lilliefors Critical Value		0.0826		
Data not Normal at 5% Significance Level				Data not Lognormal at 5% Significance Level			
Assuming Normal Distribution				Assuming Lognormal Distribution			
95% UTL with 90% Coverage		16079	95% UTL with 90% Coverage		18399		
95% UPL (t)		16611	95% UPL (t)		19541		
90% Percentile (z)		15330	90% Percentile (z)		16902		
95% Percentile (z)		16542	95% Percentile (z)		19389		
99% Percentile (z)		18814	99% Percentile (z)		25083		
Gamma Distribution Test				Data Distribution Test			
k star		8.307	Data do not follow a Discernable Distribution (0.05)				
Theta Star		1331					
MLE of Mean		11056					
MLE of Standard Deviation		3836					
nu star		1911					
A-D Test Statistic		4.181	Nonparametric Statistics				
5% A-D Critical Value		0.753	90% Percentile		15160		
K-S Test Statistic		0.159	95% Percentile		15650		
5% K-S Critical Value		0.0856	99% Percentile		17058		
Data not Gamma Distributed at 5% Significance Level							
Assuming Gamma Distribution				95% UTL with 90% Coverage			
90% Percentile		16168	95% Percentile Bootstrap UTL with 90% Coverage		15500		
95% Percentile		18027	95% BCA Bootstrap UTL with 90% Coverage		15500		
99% Percentile		21871	95% UPL		16020		
95% WH Approx. Gamma UPL		18081	95% Chebyshev UPL		25656		
95% HW Approx. Gamma UPL		18378	Upper Threshold Limit Based upon IQR		19730		
95% WH Approx. Gamma UTL with 90% Coverage		17254					
95% HW Approx. Gamma UTL with 90% Coverage		17489					
M MG/KG ANTIMONY (br_na)							
General Statistics							
Number of Valid Data		30	Number of Detected Data		2		
Number of Distinct Detected Data		2	Number of Non-Detect Data		28		
Warning: Data set has only 2 Detected Values.							
This is not enough to compute meaningful and reliable test statistics and estimates.							
No statistics will be produced!							
Tolerance Factor		1.777	Percent Non-Detects		93.33%		
Raw Statistics				Log-transformed Statistics			
Minimum Detected		0.52	Minimum Detected		-0.654		
Maximum Detected		0.55	Maximum Detected		-0.598		

Table 2
ProUCL Output

				Mean of Detected	0.535					Mean of Detected	-0.626		
				SD of Detected	0.0212					SD of Detected	0.0397		
				Minimum Non-Detect	0.49					Minimum Non-Detect	-0.713		
				Maximum Non-Detect	2.5					Maximum Non-Detect	0.916		
				Data with Multiple Detection Limits						Single Detection Limit Scenario			
				Note: Data have multiple DLs - Use of KM Method is recommended						Number treated as Non-Detect with Single DL	30		
				For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL	0		
				Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage	100.00%		
				Warning: Data set has only 2 Distinct Detected Values.									
				This may not be adequate enough to compute meaningful and reliable test statistics and estimates.									
				The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).									
				Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.									
				The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.									
				Those methods will return a 'N/A' value on your output display!									
				It is necessary to have 4 or more Distinct Values for bootstrap methods.									
				However, results obtained using 4 to 9 distinct values may not be reliable.									
				It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.									
				Background Statistics									
				Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only			
				Shapiro Wilk Test Statistic		N/A				Shapiro Wilk Test Statistic		N/A	
				5% Shapiro Wilk Critical Value		N/A				5% Shapiro Wilk Critical Value		N/A	
				Data not Normal at 5% Significance Level						Data not Lognormal at 5% Significance Level			
				Assuming Normal Distribution						Assuming Lognormal Distribution			
				DL/2 Substitution Method						DL/2 Substitution Method			
				Mean		0.458				Mean (Log Scale)		-0.862	
				SD		0.205				SD (Log Scale)		0.403	
				95% UTL 90% Coverage		0.822				95% UTL 90% Coverage		0.864	
				95% UPL (t)		0.812				95% UPL (t)		0.847	
				90% Percentile (z)		0.721				90% Percentile (z)		0.708	
				95% Percentile (z)		0.795				95% Percentile (z)		0.82	
				99% Percentile (z)		0.935				99% Percentile (z)		1.078	
				Maximum Likelihood Estimate(MLE) Method		N/A				Log ROS Method			
										Mean in Original Scale		N/A	
										SD in Original Scale		N/A	
										Mean in Log Scale		N/A	
										SD in Log Scale		N/A	
										95% UTL 90% Coverage		N/A	
										95% UPL (t)		N/A	
										90% Percentile (z)		N/A	
										95% Percentile (z)		N/A	
										99% Percentile (z)		N/A	
				Gamma Distribution Test with Detected Values Only						Data Distribution Test with Detected Values Only			
				k star (bias corrected)		N/A				Data do not follow a Discernable Distribution (0.05)			
				Theta Star		N/A							
				nu star		N/A							
				A-D Test Statistic		N/A				Nonparametric Statistics			
				5% A-D Critical Value		N/A				Kaplan-Meier (KM) Method			
				K-S Test Statistic		N/A				Mean		0.523	
				5% K-S Critical Value		N/A				SD		0.00862	
				Data not Gamma Distributed at 5% Significance Level						SE of Mean		0.00368	
										95% KM UTL with 90% Coverage		0.538	
				Assuming Gamma Distribution						95% KM Chebyshev UPL		0.561	
				Gamma ROS Statistics with Extrapolated Data						95% KM UPL (t)		0.538	

Table 2
ProUCL Output

				Mean	N/A					90% Percentile (z)	0.534	
				Median	N/A					95% Percentile (z)	0.537	
				SD	N/A					99% Percentile (z)	0.543	
				k star	N/A							
				Theta star	N/A					Gamma ROS Limits with Extrapolated Data		
				Nu star	N/A					95% Wilson Hilferty (WH) Approx. Gamma UPL	N/A	
				95% Percentile of Chisquare (2k)	N/A					95% Hawkins Wixley (HW) Approx. Gamma UPL	N/A	
										95% WH Approx. Gamma UTL with 90% Coverage	N/A	
				90% Percentile	N/A					95% HW Approx. Gamma UTL with 90% Coverage	N/A	
				95% Percentile	N/A							
				99% Percentile	N/A							
				Note: DL/2 is not a recommended method.								
				M MG/KG ANTIMONY (so_sb)								
				General Statistics								
				Number of Valid Data	100					Number of Detected Data	0	
				Number of Distinct Detected Data	0					Number of Non-Detect Data	100	
				Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
				Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
				The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).								
				The data set for variable M MG/KG ANTIMONY (so_sb) was not processed!								
				M MG/KG ANTIMONY (so_ss)								
				General Statistics								
				Number of Valid Data	115					Number of Detected Data	0	
				Number of Distinct Detected Data	0					Number of Non-Detect Data	115	
				Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
				Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
				The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).								
				The data set for variable M MG/KG ANTIMONY (so_ss) was not processed!								
				M MG/KG ARSENIC (br_na)								
				General Statistics								
				Total Number of Observations	30					Number of Distinct Observations	30	
				Tolerance Factor	1.777							
				Raw Statistics				Log-Transformed Statistics				
				Minimum	0.23			Minimum	-1.47			
				Maximum	78.8			Maximum	4.367			
				Second Largest	68.8			Second Largest	4.231			
				First Quartile	7.575			First Quartile	2.024			
				Median	21.85			Median	3.082			
				Third Quartile	45.55			Third Quartile	3.819			
				Mean	27.43			Mean	2.681			
				SD	23.02			SD	1.468			
				Coefficient of Variation	0.839							
				Skewness	0.548							
				Background Statistics								
				Normal Distribution Test				Lognormal Distribution Test				
				Shapiro Wilk Test Statistic	0.906			Shapiro Wilk Test Statistic	0.878			

Table 2
ProUCL Output

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Table 2
ProUCL Output

			99% Percentile (z)	31.87					99% Percentile (z)	51.37		
			Gamma Distribution Test						Data Distribution Test			
			k star	1.743					Data do not follow a Discernable Distribution (0.05)			
			Theta Star	6.329								
			MLE of Mean	11.03								
			MLE of Standard Deviation	8.356								
			nu star	348.6								
			A-D Test Statistic	1.691					Nonparametric Statistics			
			5% A-D Critical Value	0.767					90% Percentile	22.67		
			K-S Test Statistic	0.139					95% Percentile	25.2		
			5% K-S Critical Value	0.0908					99% Percentile	42.61		
			Data not Gamma Distributed at 5% Significance Level									
			Assuming Gamma Distribution						95% UTL with 90% Coverage	24.6		
			90% Percentile	22.17					95% Percentile Bootstrap UTL with 90% Coverage	24.64		
			95% Percentile	27.35					95% BCA Bootstrap UTL with 90% Coverage	24.64		
			99% Percentile	38.93					95% UPL	28.71		
									95% Chebyshev UPL	50.27		
			95% WH Approx. Gamma UPL	27.31					Upper Threshold Limit Based upon IQR	34.3		
			95% HW Approx. Gamma UPL	27.84								
			95% WH Approx. Gamma UTL with 90% Coverage	25.17								
			95% HW Approx. Gamma UTL with 90% Coverage	25.5								
			M MG/KG ARSENIC (so_ss)									
			General Statistics									
			Total Number of Observations	115					Number of Distinct Observations	83		
			Tolerance Factor	1.506								
			Raw Statistics						Log-Transformed Statistics			
			Minimum	0.83					Minimum	-0.186		
			Maximum	71.7					Maximum	4.272		
			Second Largest	23.5					Second Largest	3.157		
			First Quartile	3					First Quartile	1.099		
			Median	5.8					Median	1.758		
			Third Quartile	9.45					Third Quartile	2.246		
			Mean	7.172					Mean	1.629		
			SD	7.679					SD	0.847		
			Coefficient of Variation	1.071								
			Skewness	5.491								
			Background Statistics									
			Normal Distribution Test						Lognormal Distribution Test			
			Lilliefors Test Statistic	0.204					Lilliefors Test Statistic	0.0836		
			Lilliefors Critical Value	0.0826					Lilliefors Critical Value	0.0826		
			Data not Normal at 5% Significance Level						Data not Lognormal at 5% Significance Level			
			Assuming Normal Distribution						Assuming Lognormal Distribution			
			95% UTL with 90% Coverage	18.74					95% UTL with 90% Coverage	18.24		
			95% UPL (t)	19.96					95% UPL (t)	20.88		
			90% Percentile (z)	17.01					90% Percentile (z)	15.09		
			95% Percentile (z)	19.8					95% Percentile (z)	20.52		
			99% Percentile (z)	25.04					99% Percentile (z)	36.53		
			Gamma Distribution Test						Data Distribution Test			
			k star	1.575					Data appear Gamma Distributed at 5% Significance Level			
			Theta Star	4.553								
			MLE of Mean	7.172								
			MLE of Standard Deviation	5.715								
			nu star	362.3								

Table 2
ProUCL Output

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Table 2
ProUCL Output

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ProUCL Output

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Table 2
ProUCL Output

	Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only				
	Lilliefors Test Statistic 0.0982					Lilliefors Test Statistic 0.116				
	5% Lilliefors Critical Value 0.101					5% Lilliefors Critical Value 0.101				
	Data appear Normal at 5% Significance Level					Data not Lognormal at 5% Significance Level				
	Assuming Normal Distribution					Assuming Lognormal Distribution				
	DL/2 Substitution Method					DL/2 Substitution Method				
	Mean 0.369					Mean (Log Scale) -1.066				
	SD 0.129					SD (Log Scale) 0.39				
	95% UTL 90% Coverage 0.562					95% UTL 90% Coverage 0.619				
	95% UPL (t) 0.583					95% UPL (t) 0.659				
	90% Percentile (z) 0.533					90% Percentile (z) 0.567				
	95% Percentile (z) 0.58					95% Percentile (z) 0.654				
	99% Percentile (z) 0.668					99% Percentile (z) 0.853				
	Maximum Likelihood Estimate(MLE) Method N/A					Log ROS Method				
						Mean in Original Scale 0.371				
						SD in Original Scale 0.134				
						Mean in Log Scale -1.065				
						SD in Log Scale 0.406				
						95% UTL 90% Coverage 0.636				
						95% UPL (t) 0.678				
						90% Percentile (z) 0.58				
						95% Percentile (z) 0.672				
						99% Percentile (z) 0.887				
	Gamma Distribution Test with Detected Values Only					Data Distribution Test with Detected Values Only				
	k star (bias corrected) 5.072					Data appear Normal at 5% Significance Level				
	Theta Star 0.0755									
	nu star 781.1									
	A-D Test Statistic 1.61					Nonparametric Statistics				
	5% A-D Critical Value 0.754					Kaplan-Meier (KM) Method				
	K-S Test Statistic 0.114					Mean 0.38				
	5% K-S Critical Value 0.102					SD 0.151				
	Data not Gamma Distributed at 5% Significance Level					SE of Mean 0.0171				
						95% KM UTL with 90% Coverage 0.608				
	Assuming Gamma Distribution					95% KM Chebyshev UPL 1.041				
	Gamma ROS Statistics with Extrapolated Data					95% KM UPL (t) 0.632				
	Mean 0.39					90% Percentile (z) 0.574				
	Median 0.404					95% Percentile (z) 0.628				
	SD 0.133					99% Percentile (z) 0.731				
	k star 6.905									
	Theta star 0.0564					Gamma ROS Limits with Extrapolated Data				
	Nu star 1588					95% Wilson Hiferty (WH) Approx. Gamma UPL 0.664				
	95% Percentile of Chisquare (2k) 23.43					95% Hawkins Wixley (HW) Approx. Gamma UPL 0.674				
						95% WH Approx. Gamma UTL with 90% Coverage 0.631				
	90% Percentile 0.588					95% HW Approx. Gamma UTL with 90% Coverage 0.639				
	95% Percentile 0.661									
	99% Percentile 0.815									
	Note: DL/2 is not a recommended method.									
	M MG/KG CADMIUM (br_na)									
	General Statistics									
	Number of Valid Data 30					Number of Detected Data 0				
	Number of Distinct Detected Data 0					Number of Non-Detect Data 30				
	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!									
	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!									
	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).									

Table 2
ProUCL Output

The data set for variable M MG/KG CADMIUM (br_na) was not processed!											
M MG/KG CADMIUM (so_sb)											
General Statistics											
Number of Valid Data				100		Number of Detected Data				18	
Number of Distinct Detected Data				13		Number of Non-Detect Data				82	
Tolerance Factor				1.524		Percent Non-Detects				82.00%	
Raw Statistics						Log-transformed Statistics					
Minimum Detected				0.067		Minimum Detected				-2.703	
Maximum Detected				0.25		Maximum Detected				-1.386	
Mean of Detected				0.153		Mean of Detected				-1.942	
SD of Detected				0.0545		SD of Detected				0.384	
Minimum Non-Detect				0.051		Minimum Non-Detect				-2.976	
Maximum Non-Detect				0.23		Maximum Non-Detect				-1.47	
Data with Multiple Detection Limits						Single Detection Limit Scenario					
Note: Data have multiple DLs - Use of KM Method is recommended						Number treated as Non-Detect with Single DL				97	
For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL				3	
Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage				97.00%	
Background Statistics											
Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only					
Shapiro Wilk Test Statistic				0.953		Shapiro Wilk Test Statistic				0.947	
5% Shapiro Wilk Critical Value				0.897		5% Shapiro Wilk Critical Value				0.897	
Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level					
Assuming Normal Distribution						Assuming Lognormal Distribution					
DL/2 Substitution Method						DL/2 Substitution Method					
Mean				0.0641		Mean (Log Scale)				-2.985	
SD				0.0516		SD (Log Scale)				0.651	
95% UTL 90% Coverage				0.143		95% UTL 90% Coverage				0.136	
95% UPL (t)				0.15		95% UPL (t)				0.15	
90% Percentile (z)				0.13		90% Percentile (z)				0.116	
95% Percentile (z)				0.149		95% Percentile (z)				0.148	
99% Percentile (z)				0.184		99% Percentile (z)				0.23	
Maximum Likelihood Estimate(MLE) Method						Log ROS Method					
Mean				0.18		Mean in Original Scale				0.0624	
SD				0.0294		SD in Original Scale				0.0504	
95% UTL with 90% Coverage				0.225		95% UTL with 90% Coverage				0.129	
						95% BCA UTL with 90% Coverage				0.16	
						95% Bootstrap (%) UTL with 90% Coverage				0.162	
95% UPL (t)				0.229		95% UPL (t)				0.142	
90% Percentile (z)				0.218		90% Percentile (z)				0.111	
95% Percentile (z)				0.229		95% Percentile (z)				0.139	
99% Percentile (z)				0.249		99% Percentile (z)				0.213	
Gamma Distribution Test with Detected Values Only						Data Distribution Test with Detected Values Only					
k star (bias corrected)				6.544		Data appear Normal at 5% Significance Level					
Theta Star				0.0234							
nu star				235.6							
A-D Test Statistic				0.293		Nonparametric Statistics					
5% A-D Critical Value				0.741		Kaplan-Meier (KM) Method					
K-S Test Statistic				0.117		Mean				0.0837	
5% K-S Critical Value				0.204		SD				0.0405	
Data appear Gamma Distributed at 5% Significance Level						SE of Mean				0.00427	
						95% KM UTL with 90% Coverage				0.145	
Assuming Gamma Distribution						95% KM Chebyshev UPL				0.261	
Gamma ROS Statistics with Extrapolated Data						95% KM UPL (t)				0.151	

Table 2
ProUCL Output

				Mean	0.0287					90% Percentile (z)	0.136		
				Median	1E-06					95% Percentile (z)	0.15		
				SD	0.0633					99% Percentile (z)	0.178		
				k star	0.107								
				Theta star	0.268					Gamma ROS Limits with Extrapolated Data			
				Nu star	21.39					95% Wilson Hiferty (WH) Approx. Gamma UPL	0.0935		
				95% Percentile of Chisquare (2k)	1.236					95% Hawkins Wixley (HW) Approx. Gamma UPL	0.0829		
										95% WH Approx. Gamma UTL with 90% Coverage	0.0764		
				90% Percentile	0.0784					95% HW Approx. Gamma UTL with 90% Coverage	0.064		
				95% Percentile	0.166								
				99% Percentile	0.441								
				Note: DL/2 is not a recommended method.									
				M MG/KG CADMIUM (so_ss)									
				General Statistics									
				Number of Valid Data	115					Number of Detected Data	9		
				Number of Distinct Detected Data	9					Number of Non-Detect Data	106		
				Tolerance Factor	1.506					Percent Non-Detects	92.17%		
				Raw Statistics					Log-transformed Statistics				
				Minimum Detected	0.068					Minimum Detected	-2.688		
				Maximum Detected	0.53					Maximum Detected	-0.635		
				Mean of Detected	0.147					Mean of Detected	-2.155		
				SD of Detected	0.146					SD of Detected	0.633		
				Minimum Non-Detect	0.049					Minimum Non-Detect	-3.016		
				Maximum Non-Detect	0.815					Maximum Non-Detect	-0.205		
				Data with Multiple Detection Limits					Single Detection Limit Scenario				
				Note: Data have multiple DLs - Use of KM Method is recommen					Number treated as Non-Detect with Single DL 115				
				For all methods (except KM, DL/2, and ROS Methods),					Number treated as Detected with Single DL 0				
				Observations < Largest ND are treated as NDs					Single DL Non-Detect Percentage 100.00%				
				Warning: There are only 9 Detected Values in this data									
				Note: It should be noted that even though bootstrap may be performed on this data set									
				the resulting calculations may not be reliable enough to draw conclusions									
				It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.									
				Background Statistics									
				Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only				
				Shapiro Wilk Test Statistic	0.564					Shapiro Wilk Test Statistic	0.775		
				5% Shapiro Wilk Critical Value	0.829					5% Shapiro Wilk Critical Value	0.829		
				Data not Normal at 5% Significance Level					Data not Lognormal at 5% Significance Level				
				Assuming Normal Distribution					Assuming Lognormal Distribution				
				DL/2 Substitution Method						DL/2 Substitution Method			
				Mean	0.151					Mean (Log Scale)	-2.477		
				SD	0.148					SD (Log Scale)	1.111		
				95% UTL 90% Coverage	0.373					95% UTL 90% Coverage	0.448		
				95% UPL (t)	0.397					95% UPL (t)	0.534		
				90% Percentile (z)	0.34					90% Percentile (z)	0.349		
				95% Percentile (z)	0.394					95% Percentile (z)	0.522		
				99% Percentile (z)	0.495					99% Percentile (z)	1.113		
				Maximum Likelihood Estimate(MLE) Method	N/A					Log ROS Method			
									Mean in Original Scale	0.0232			
									SD in Original Scale	0.0538			
									Mean in Log Scale	-4.38			
									SD in Log Scale	0.913			
									95% UTL 90% Coverage	0.0496			

Table 2
ProUCL Output

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Table 2
ProUCL Output

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Gamma Distribution Test with Detected Values Only				Data Distribution Test with Detected Values Only						
k star (bias corrected)				1.862	Data do not follow a Discernable Distribution (0.05)					
Theta Star				377.4						
nu star				279.3						
A-D Test Statistic				3.435	Nonparametric Statistics					
5% A-D Critical Value				0.764	Kaplan-Meier (KM) Method					
K-S Test Statistic				0.165	Mean					
5% K-S Critical Value				0.105	SD					
Data not Gamma Distributed at 5% Significance Level					SE of Mean					
					95% KM UTL with 90% Coverage					
					95% KM Chebyshev UPL					
Assuming Gamma Distribution					95% KM UPL (t)					
Gamma ROS Statistics with Extrapolated Data					90% Percentile (z)					
Mean				586.2	95% Percentile (z)					
Median				452.4	99% Percentile (z)					
SD				616						
k star				0.645						
Theta star				908.4	Gamma ROS Limits with Extrapolated Data					
Nu star				148.4	95% Wilson Hiferty (WH) Approx. Gamma UPL					
95% Percentile of Chisquare (2k)				4.524	95% Hawkins Wixley (HW) Approx. Gamma UPL					
					95% WH Approx. Gamma UTL with 90% Coverage					
90% Percentile				1500	95% HW Approx. Gamma UTL with 90% Coverage					
95% Percentile				2055						
99% Percentile				3389						
Note: DL/2 is not a recommended method.										
M MG/KG CHROMIUM (br_na)										
General Statistics										
Number of Valid Data				30	Number of Detected Data				29	
Number of Distinct Detected Data				27	Number of Non-Detect Data				1	
Tolerance Factor				1.777	Percent Non-Detects				3.33%	
Raw Statistics					Log-transformed Statistics					
Minimum Detected				3.7	Minimum Detected				1.308	
Maximum Detected				18.1	Maximum Detected				2.896	
Mean of Detected				8.698	Mean of Detected				2.079	
SD of Detected				3.687	SD of Detected				0.417	
Minimum Non-Detect				0.35	Minimum Non-Detect				-1.05	
Maximum Non-Detect				0.35	Maximum Non-Detect				-1.05	
Background Statistics										
Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only					
Shapiro Wilk Test Statistic					0.93	Shapiro Wilk Test Statistic				
5% Shapiro Wilk Critical Value					0.926	5% Shapiro Wilk Critical Value				
Data appear Normal at 5% Significance Level					Data appear Lognormal at 5% Significance Level					
Assuming Normal Distribution					Assuming Lognormal Distribution					
DL/2 Substitution Method					DL/2 Substitution Method					
Mean				8.414	Mean (Log Scale)				1.952	
SD				3.943	SD (Log Scale)				0.809	
95% UTL 90% Coverage				15.42	95% UTL 90% Coverage				29.67	
95% UPL (t)				15.23	95% UPL (t)				28.5	
90% Percentile (z)				13.47	90% Percentile (z)				19.87	
95% Percentile (z)				14.9	95% Percentile (z)				26.66	
99% Percentile (z)				17.59	99% Percentile (z)				46.28	
Maximum Likelihood Estimate(MLE) Method					Log ROS Method					
Mean				8.371	Mean in Original Scale				8.501	
SD				3.983	SD in Original Scale				3.781	
95% UTL with 90% Coverage				15.45	95% UTL with 90% Coverage				17.28	

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			99% Percentile (z)	19.42					99% Percentile (z)	21.52		
			Gamma Distribution Test						Data Distribution Test			
			k star	22.27					Data appear Normal at 5% Significance Level			
			Theta Star	0.595								
			MLE of Mean	13.26								
			MLE of Standard Deviation	2.809								
			nu star	4453								
			A-D Test Statistic	1.54					Nonparametric Statistics			
			5% A-D Critical Value	0.75					90% Percentile	16.03		
			K-S Test Statistic	0.111					95% Percentile	16.82		
			5% K-S Critical Value	0.0892					99% Percentile	18.83		
			Data not Gamma Distributed at 5% Significance Level									
			Assuming Gamma Distribution						95% UTL with 90% Coverage	16.7		
			90% Percentile	16.96					95% Percentile Bootstrap UTL with 90% Coverage	16.71		
			95% Percentile	18.19					95% BCA Bootstrap UTL with 90% Coverage	16.71		
			99% Percentile	20.65					95% UPL	17.18		
									95% Chebyshev UPL	24.85		
			95% WH Approx. Gamma UPL	18.22					Upper Threshold Limit Based upon IQR	19.65		
			95% HW Approx. Gamma UPL	18.32								
			95% WH Approx. Gamma UTL with 90% Coverage	17.73								
			95% HW Approx. Gamma UTL with 90% Coverage	17.81								
			M MG/KG CHROMIUM (so_ss)									
			General Statistics									
			Total Number of Observations	115					Number of Distinct Observations	72		
			Tolerance Factor	1.506								
			Raw Statistics						Log-Transformed Statistics			
			Minimum	4.8					Minimum	1.569		
			Maximum	28.2					Maximum	3.339		
			Second Largest	17.4					Second Largest	2.856		
			First Quartile	8					First Quartile	2.079		
			Median	11.7					Median	2.46		
			Third Quartile	13.7					Third Quartile	2.617		
			Mean	11.2					Mean	2.357		
			SD	3.724					SD	0.355		
			Coefficient of Variation	0.333								
			Skewness	0.594								
			Background Statistics									
			Normal Distribution Test						Lognormal Distribution Test			
			Lilliefors Test Statistic	0.083					Lilliefors Test Statistic	0.149		
			Lilliefors Critical Value	0.0826					Lilliefors Critical Value	0.0826		
			Data not Normal at 5% Significance Level						Data not Lognormal at 5% Significance Level			
			Assuming Normal Distribution						Assuming Lognormal Distribution			
			95% UTL with 90% Coverage	16.81					95% UTL with 90% Coverage	18.02		
			95% UPL (t)	17.4					95% UPL (t)	19.06		
			90% Percentile (z)	15.97					90% Percentile (z)	16.64		
			95% Percentile (z)	17.32					95% Percentile (z)	18.92		
			99% Percentile (z)	19.86					99% Percentile (z)	24.1		
			Gamma Distribution Test						Data Distribution Test			
			k star	8.465					Data do not follow a Discernable Distribution (0.05)			
			Theta Star	1.323								
			MLE of Mean	11.2								
			MLE of Standard Deviation	3.848								
			nu star	1947								

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			90% Percentile	26.93		95% Percentile Bootstrap UTL with 90% Coverage	31.81						
			95% Percentile	32.6		95% BCA Bootstrap UTL with 90% Coverage	31.81						
			99% Percentile	45.12		95% UPL	34.22						
						95% Chebyshev UPL	49.72						
			95% WH Approx. Gamma UPL	32.95		Upper Threshold Limit Based upon IQR	27.04						
			95% HW Approx. Gamma UPL	35									
			95% WH Approx. Gamma UTL with 90% Coverage	33.74									
			95% HW Approx. Gamma UTL with 90% Coverage	35.94									
			M MG/KG COBALT (so_sb)										
			General Statistics										
			Total Number of Observations	100		Number of Distinct Observations	72						
			Tolerance Factor	1.524									
			Raw Statistics				Log-Transformed Statistics						
			Minimum	4.6		Minimum	1.526						
			Maximum	19.9		Maximum	2.991						
			Second Largest	17.7		Second Largest	2.874						
			First Quartile	6.7		First Quartile	1.902						
			Median	8.875		Median	2.183						
			Third Quartile	11.93		Third Quartile	2.479						
			Mean	9.784		Mean	2.217						
			SD	3.573		SD	0.358						
			Coefficient of Variation	0.365									
			Skewness	0.719									
			Background Statistics										
			Normal Distribution Test				Lognormal Distribution Test						
			Lilliefors Test Statistic	0.117		Lilliefors Test Statistic	0.097						
			Lilliefors Critical Value	0.0886		Lilliefors Critical Value	0.0886						
			Data not Normal at 5% Significance Level				Data not Lognormal at 5% Significance Level						
			Assuming Normal Distribution				Assuming Lognormal Distribution						
			95% UTL with 90% Coverage	15.23		95% UTL with 90% Coverage	15.85						
			95% UPL (t)	15.75		95% UPL (t)	16.69						
			90% Percentile (z)	14.36		90% Percentile (z)	14.53						
			95% Percentile (z)	15.66		95% Percentile (z)	16.55						
			99% Percentile (z)	18.1		99% Percentile (z)	21.13						
			Gamma Distribution Test				Data Distribution Test						
			k star	7.76		Data do not follow a Discernable Distribution (0.05)							
			Theta Star	1.261									
			MLE of Mean	9.784									
			MLE of Standard Deviation	3.512									
			nu star	1552									
			A-D Test Statistic	0.917		Nonparametric Statistics							
			5% A-D Critical Value	0.753		90% Percentile	14.81						
			K-S Test Statistic	0.101		95% Percentile	16.82						
			5% K-S Critical Value	0.0895		99% Percentile	17.72						
			Data not Gamma Distributed at 5% Significance Level										
			Assuming Gamma Distribution				95% UTL with 90% Coverage	16.8					
			90% Percentile	14.47		95% Percentile Bootstrap UTL with 90% Coverage	16.8						
			95% Percentile	16.18		95% BCA Bootstrap UTL with 90% Coverage	16.8						
			99% Percentile	19.74		95% UPL	17.09						
						95% Chebyshev UPL	25.44						
			95% WH Approx. Gamma UPL	16.23		Upper Threshold Limit Based upon IQR	19.76						
			95% HW Approx. Gamma UPL	16.33									
			95% WH Approx. Gamma UTL with 90% Coverage	15.53									
			95% HW Approx. Gamma UTL with 90% Coverage	15.6									

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M MG/KG COBALT (so_ss)											
General Statistics											
Total Number of Observations				115		Number of Distinct Observations				62	
Tolerance Factor				1.506							
Raw Statistics						Log-Transformed Statistics					
Minimum				0.85		Minimum				-0.163	
Maximum				13.8		Maximum				2.625	
Second Largest				11.9		Second Largest				2.477	
First Quartile				2.35		First Quartile				0.854	
Median				4.2		Median				1.435	
Third Quartile				6		Third Quartile				1.792	
Mean				4.382		Mean				1.328	
SD				2.402		SD				0.563	
Coefficient of Variation				0.548							
Skewness				1.102							
Background Statistics											
Normal Distribution Test						Lognormal Distribution Test					
Lilliefors Test Statistic				0.0995		Lilliefors Test Statistic				0.0973	
Lilliefors Critical Value				0.0826		Lilliefors Critical Value				0.0826	
Data not Normal at 5% Significance Level						Data not Lognormal at 5% Significance Level					
Assuming Normal Distribution						Assuming Lognormal Distribution					
95% UTL with 90% Coverage				7.999		95% UTL with 90% Coverage				8.811	
95% UPL (t)				8.382		95% UPL (t)				9.639	
90% Percentile (z)				7.46		90% Percentile (z)				7.764	
95% Percentile (z)				8.332		95% Percentile (z)				9.527	
99% Percentile (z)				9.969		99% Percentile (z)				13.98	
Gamma Distribution Test						Data Distribution Test					
k star				3.414		Data Follow Appr. Gamma Distribution at 5% Significance Level					
Theta Star				1.284							
MLE of Mean				4.382							
MLE of Standard Deviation				2.372							
nu star				785.1							
A-D Test Statistic				0.797		Nonparametric Statistics					
5% A-D Critical Value				0.758		90% Percentile				7.32	
K-S Test Statistic				0.0686		95% Percentile				7.89	
5% K-S Critical Value				0.086		99% Percentile				11.83	
Data follow Appx. Gamma Distribution at 5% Significance Level											
Assuming Gamma Distribution						95% UTL with 90% Coverage					
90% Percentile				7.562		95% Percentile Bootstrap UTL with 90% Coverage				7.7	
95% Percentile				8.867		95% BCA Bootstrap UTL with 90% Coverage				7.7	
99% Percentile				11.68		95% UPL				8.16	
						95% Chebyshev UPL				14.9	
95% WH Approx. Gamma UPL				8.89		Upper Threshold Limit Based upon IQR				11.48	
95% HW Approx. Gamma UPL				9.03							
95% WH Approx. Gamma UTL with 90% Coverage				8.303							
95% HW Approx. Gamma UTL with 90% Coverage				8.397							
M MG/KG COPPER (br_na)											
General Statistics											
Total Number of Observations				30		Number of Distinct Observations				29	
Tolerance Factor				1.777							

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			Mean	15.13				Mean	2.661
			SD	5.479				SD	0.329
			Coefficient of Variation	0.362					
			Skewness	1.859					
			Background Statistics						
			Normal Distribution Test			Lognormal Distribution Test			
			Lilliefors Test Statistic	0.108		Lilliefors Test Statistic		0.0466	
			Lilliefors Critical Value	0.0886		Lilliefors Critical Value		0.0886	
			Data not Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level			
			Assuming Normal Distribution			Assuming Lognormal Distribution			
			95% UTL with 90% Coverage	23.48		95% UTL with 90% Coverage		23.64	
			95% UPL (t)	24.27		95% UPL (t)		24.79	
			90% Percentile (z)	22.15		90% Percentile (z)		21.83	
			95% Percentile (z)	24.14		95% Percentile (z)		24.6	
			99% Percentile (z)	27.88		99% Percentile (z)		30.79	
			Gamma Distribution Test			Data Distribution Test			
			k star	8.886		Data appear Gamma Distributed at 5% Significance Level			
			Theta Star	1.703					
			MLE of Mean	15.13					
			MLE of Standard Deviation	5.075					
			nu star	1777					
			A-D Test Statistic	0.613		Nonparametric Statistics			
			5% A-D Critical Value	0.753		90% Percentile		21.21	
			K-S Test Statistic	0.068		95% Percentile		24.42	
			5% K-S Critical Value	0.0894		99% Percentile		30.63	
			Data appear Gamma Distributed at 5% Significance Level						
			Assuming Gamma Distribution			95% UTL with 90% Coverage		23.6	
			90% Percentile	21.89		95% Percentile Bootstrap UTL with 90% Coverage		23.68	
			95% Percentile	24.33		95% BCA Bootstrap UTL with 90% Coverage		23.68	
			99% Percentile	29.36		95% UPL		24.69	
						95% Chebyshev UPL		39.13	
			95% WH Approx. Gamma UPL	24.36		Upper Threshold Limit Based upon IQR		26.54	
			95% HW Approx. Gamma UPL	24.44					
			95% WH Approx. Gamma UTL with 90% Coverage	23.38					
			95% HW Approx. Gamma UTL with 90% Coverage	23.42					
			M MG/KG COPPER (so_ss)						
			General Statistics						
			Number of Valid Data	115		Number of Detected Data		75	
			Number of Distinct Detected Data	54		Number of Non-Detect Data		40	
			Tolerance Factor	1.506		Percent Non-Detects		34.78%	
			Raw Statistics			Log-transformed Statistics			
			Minimum Detected	1.6		Minimum Detected		0.47	
			Maximum Detected	20.3		Maximum Detected		3.011	
			Mean of Detected	7.051		Mean of Detected		1.799	
			SD of Detected	4.231		SD of Detected		0.551	
			Minimum Non-Detect	2.4		Minimum Non-Detect		0.875	
			Maximum Non-Detect	18.2		Maximum Non-Detect		2.901	
			Data with Multiple Detection Limits			Single Detection Limit Scenario			
			Note: Data have multiple DLs - Use of KM Method is recommen			Number treated as Non-Detect with Single DL		112	
			For all methods (except KM, DL/2, and ROS Methods),			Number treated as Detected with Single DL		3	
			Observations < Largest ND are treated as NDs			Single DL Non-Detect Percentage		97.39%	
			Background Statistics						

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ProUCL Output

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Table 2
ProUCL Output

			First Quartile	21350					First Quartile	9.968		
			Median	29500					Median	10.29		
			Third Quartile	34600					Third Quartile	10.45		
			Mean	28714					Mean	10.14		
			SD	12108					SD	0.622		
			Coefficient of Variation	0.422								
			Skewness	0.279								
			Background Statistics									
			Normal Distribution Test					Lognormal Distribution Test				
			Shapiro Wilk Test Statistic	0.977				Shapiro Wilk Test Statistic	0.795			
			Shapiro Wilk Critical Value	0.927				Shapiro Wilk Critical Value	0.927			
			Data appear Normal at 5% Significance Level					Data not Lognormal at 5% Significance Level				
			Assuming Normal Distribution					Assuming Lognormal Distribution				
			95% UTL with 90% Coverage	50230				95% UTL with 90% Coverage	76180			
			95% UPL (t)	49627				95% UPL (t)	73857			
			90% Percentile (z)	44231				90% Percentile (z)	55972			
			95% Percentile (z)	48630				95% Percentile (z)	70167			
			99% Percentile (z)	56882				99% Percentile (z)	107220			
			Gamma Distribution Test					Data Distribution Test				
			k star	3.63				Data appear Normal at 5% Significance Level				
			Theta Star	7910								
			MLE of Mean	28714								
			MLE of Standard Deviation	15071								
			nu star	217.8								
			A-D Test Statistic	0.874				Nonparametric Statistics				
			5% A-D Critical Value	0.749				90% Percentile	40420			
			K-S Test Statistic	0.141				95% Percentile	46955			
			5% K-S Critical Value	0.161				99% Percentile	57366			
			Data follow Appx. Gamma Distribution at 5% Significance Level									
			Assuming Gamma Distribution					95% UTL with 90% Coverage	47000			
			90% Percentile	48921				95% Percentile Bootstrap UTL with 90% Coverage	48460			
			95% Percentile	57131				95% BCA Bootstrap UTL with 90% Coverage	48460			
			99% Percentile	74750				95% UPL	53570			
			95% WH Approx. Gamma UPL	57815				95% Chebyshev UPL	82364			
			95% HW Approx. Gamma UPL	60305				Upper Threshold Limit Based upon IQR	54475			
			95% WH Approx. Gamma UTL with 90% Coverage	58962								
			95% HW Approx. Gamma UTL with 90% Coverage	61618								
			M MG/KG IRON (so_sb)									
			General Statistics									
			Total Number of Observations	100				Number of Distinct Observations	85			
			Tolerance Factor	1.524								
			Raw Statistics					Log-Transformed Statistics				
			Minimum	10600				Minimum	9.269			
			Maximum	51700				Maximum	10.85			
			Second Largest	42600				Second Largest	10.66			
			First Quartile	16375				First Quartile	9.704			
			Median	22650				Median	10.03			
			Third Quartile	29000				Third Quartile	10.28			
			Mean	23493				Mean	10.01			
			SD	8109				SD	0.341			
			Coefficient of Variation	0.345								
			Skewness	0.737								

Table 2
ProUCL Output

	Background Statistics											
	Normal Distribution Test						Lognormal Distribution Test					
	Lilliefors Test Statistic 0.103						Lilliefors Test Statistic 0.0822					
	Lilliefors Critical Value 0.0886						Lilliefors Critical Value 0.0886					
	Data not Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level					
	Assuming Normal Distribution						Assuming Lognormal Distribution					
	95% UTL with 90% Coverage 35851						95% UTL with 90% Coverage 37289					
	95% UPL (t) 37024						95% UPL (t) 39173					
	90% Percentile (z) 33885						90% Percentile (z) 34331					
	95% Percentile (z) 36831						95% Percentile (z) 38856					
	99% Percentile (z) 42357						99% Percentile (z) 49016					
	Gamma Distribution Test						Data Distribution Test					
	k star 8.609						Data appear Lognormal at 5% Significance Level					
	Theta Star 2729											
	MLE of Mean 23493											
	MLE of Standard Deviation 8007											
	nu star 1722											
	A-D Test Statistic 0.833						Nonparametric Statistics					
	5% A-D Critical Value 0.753						90% Percentile 34810					
	K-S Test Statistic 0.0906						95% Percentile 36230					
	5% K-S Critical Value 0.0895						99% Percentile 42691					
	Data not Gamma Distributed at 5% Significance Level											
	Assuming Gamma Distribution						95% UTL with 90% Coverage 35100					
	90% Percentile 34160						95% Percentile Bootstrap UTL with 90% Coverage 35200					
	95% Percentile 38024						95% BCA Bootstrap UTL with 90% Coverage 35460					
	99% Percentile 46002						95% UPL 38570					
							95% Chebyshev UPL 59015					
	95% WH Approx. Gamma UPL 38127						Upper Threshold Limit Based upon IQR 47938					
	95% HW Approx. Gamma UPL 38348											
	95% WH Approx. Gamma UTL with 90% Coverage 36564											
	95% HW Approx. Gamma UTL with 90% Coverage 36716											
	M MG/KG IRON (so_ss)											
	General Statistics											
	Total Number of Observations 115						Number of Distinct Observations 91					
	Tolerance Factor 1.506											
	Raw Statistics						Log-Transformed Statistics					
	Minimum 5940						Minimum 8.689					
	Maximum 53900						Maximum 10.89					
	Second Largest 43300						Second Largest 10.68					
	First Quartile 10150						First Quartile 9.225					
	Median 15300						Median 9.636					
	Third Quartile 18750						Third Quartile 9.839					
	Mean 15655						Mean 9.58					
	SD 6720						SD 0.394					
	Coefficient of Variation 0.429											
	Skewness 2.17											
	Background Statistics											
	Normal Distribution Test						Lognormal Distribution Test					
	Lilliefors Test Statistic 0.102						Lilliefors Test Statistic 0.118					
	Lilliefors Critical Value 0.0826						Lilliefors Critical Value 0.0826					
	Data not Normal at 5% Significance Level						Data not Lognormal at 5% Significance Level					
	Assuming Normal Distribution						Assuming Lognormal Distribution					
	95% UTL with 90% Coverage 25776						95% UTL with 90% Coverage 26200					

Table 2
ProUCL Output

				95% UPL (t)	26847					95% UPL (t)	27897	
				90% Percentile (z)	24267					90% Percentile (z)	23982	
				95% Percentile (z)	26708					95% Percentile (z)	27671	
				99% Percentile (z)	31288					99% Percentile (z)	36188	
				Gamma Distribution Test						Data Distribution Test		
				k star	6.395					Data do not follow a Discernable Distribution (0.05)		
				Theta Star	2448							
				MLE of Mean	15655							
				MLE of Standard Deviation	6191							
				nu star	1471							
				A-D Test Statistic	1.241					Nonparametric Statistics		
				5% A-D Critical Value	0.754					90% Percentile	22840	
				K-S Test Statistic	0.0951					95% Percentile	23890	
				5% K-S Critical Value	0.0857					99% Percentile	40962	
				Data not Gamma Distributed at 5% Significance Level								
				Assuming Gamma Distribution						95% UTL with 90% Coverage	23500	
				90% Percentile	23927					95% Percentile Bootstrap UTL with 90% Coverage	23500	
				95% Percentile	27030					95% BCA Bootstrap UTL with 90% Coverage	23680	
				99% Percentile	33516					95% UPL	24200	
										95% Chebyshev UPL	45073	
				95% WH Approx. Gamma UPL	27057					Upper Threshold Limit Based upon IQR	31650	
				95% HW Approx. Gamma UPL	27211							
				95% WH Approx. Gamma UTL with 90% Coverage	25675							
				95% HW Approx. Gamma UTL with 90% Coverage	25764							
				M MG KG LEAD (br_na)								
				General Statistics								
				Total Number of Observations	30					Number of Distinct Observations	29	
				Tolerance Factor	1.777							
				Raw Statistics						Log-Transformed Statistics		
				Minimum	0.965					Minimum	-0.0356	
				Maximum	31					Maximum	3.434	
				Second Largest	26.2					Second Largest	3.266	
				First Quartile	4.85					First Quartile	1.579	
				Median	7.35					Median	1.995	
				Third Quartile	13.1					Third Quartile	2.573	
				Mean	10.38					Mean	2.027	
				SD	8.173					SD	0.847	
				Coefficient of Variation	0.788							
				Skewness	1.159							
				Background Statistics								
				Normal Distribution Test						Lognormal Distribution Test		
				Shapiro Wilk Test Statistic	0.862					Shapiro Wilk Test Statistic	0.976	
				Shapiro Wilk Critical Value	0.927					Shapiro Wilk Critical Value	0.927	
				Data not Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level		
				Assuming Normal Distribution						Assuming Lognormal Distribution		
				95% UTL with 90% Coverage	24.9					95% UTL with 90% Coverage	34.21	
				95% UPL (t)	24.49					95% UPL (t)	32.8	
				90% Percentile (z)	20.85					90% Percentile (z)	22.48	
				95% Percentile (z)	23.82					95% Percentile (z)	30.59	
				99% Percentile (z)	29.39					99% Percentile (z)	54.49	
				Gamma Distribution Test						Data Distribution Test		
				k star	1.594					Data appear Gamma Distributed at 5% Significance Level		
				Theta Star	6.51							

Table 2
ProUCL Output

				MLE of Mean	10.38							
				MLE of Standard Deviation	8.219							
				nu star	95.65							
				A-D Test Statistic	0.297					Nonparametric Statistics		
				5% A-D Critical Value	0.761					90% Percentile	24.49	
				K-S Test Statistic	0.113					95% Percentile	26.2	
				5% K-S Critical Value	0.163					99% Percentile	29.61	
				Data appear Gamma Distributed at 5% Significance Level								
				Assuming Gamma Distribution						95% UTL with 90% Coverage	26.2	
				90% Percentile	21.31					95% Percentile Bootstrap UTL with 90% Coverage	26.68	
				95% Percentile	26.49					95% BCA Bootstrap UTL with 90% Coverage	26.2	
				99% Percentile	38.15					95% UPL	28.36	
										95% Chebyshev UPL	46.59	
				95% WH Approx. Gamma UPL	27.08					Upper Threshold Limit Based upon IQR		
				95% HW Approx. Gamma UPL	27.97							
				95% WH Approx. Gamma UTL with 90% Coverage	27.84							
				95% HW Approx. Gamma UTL with 90% Coverage	28.82							
				M MG/KG LEAD (so_sb)								
				General Statistics								
				Total Number of Observations	100					Number of Distinct Observations	55	
				Tolerance Factor	1.524							
				Raw Statistics						Log-Transformed Statistics		
				Minimum	5.2					Minimum	1.649	
				Maximum	13.5					Maximum	2.603	
				Second Largest	13.4					Second Largest	2.595	
				First Quartile	6.875					First Quartile	1.928	
				Median	7.85					Median	2.06	
				Third Quartile	9.125					Third Quartile	2.211	
				Mean	8.261					Mean	2.087	
				SD	1.911					SD	0.219	
				Coefficient of Variation	0.231							
				Skewness	0.977							
				Background Statistics								
				Normal Distribution Test						Lognormal Distribution Test		
				Lilliefors Test Statistic	0.132					Lilliefors Test Statistic	0.0869	
				Lilliefors Critical Value	0.0886					Lilliefors Critical Value	0.0886	
				Data not Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level		
				Assuming Normal Distribution						Assuming Lognormal Distribution		
				95% UTL with 90% Coverage	11.17					95% UTL with 90% Coverage	11.25	
				95% UPL (t)	11.45					95% UPL (t)	11.61	
				90% Percentile (z)	10.71					90% Percentile (z)	10.67	
				95% Percentile (z)	11.4					95% Percentile (z)	11.55	
				99% Percentile (z)	12.71					99% Percentile (z)	13.4	
				Gamma Distribution Test						Data Distribution Test		
				k star	20.01					Data appear Lognormal at 5% Significance Level		
				Theta Star	0.413							
				MLE of Mean	8.261							
				MLE of Standard Deviation	1.847							
				nu star	4002							
				A-D Test Statistic	1.38					Nonparametric Statistics		
				5% A-D Critical Value	0.75					90% Percentile	10.8	
				K-S Test Statistic	0.102					95% Percentile	12.24	
				5% K-S Critical Value	0.0892					99% Percentile	13.4	

Table 2
ProUCL Output

	Data not Gamma Distributed at 5% Significance Level											
	Assuming Gamma Distribution					95% UTL with 90% Coverage				11.6		
	90% Percentile	10.7	95% Percentile Bootstrap UTL with 90% Coverage				11.66					
	95% Percentile	11.51	95% BCA Bootstrap UTL with 90% Coverage				11.03					
	99% Percentile	13.15	95% UPL				12.87					
			95% Chebyshev UPL				16.63					
	95% WH Approx. Gamma UPL	11.53	Upper Threshold Limit Based upon IQR				12.5					
	95% HW Approx. Gamma UPL	11.55										
	95% WH Approx. Gamma UTL with 90% Coverage	11.2										
	95% HW Approx. Gamma UTL with 90% Coverage	11.21										
	M MG/KG LEAD (so_ss)											
	General Statistics											
	Total Number of Observations	115	Number of Distinct Observations				92					
	Tolerance Factor	1.506										
	Raw Statistics					Log-Transformed Statistics						
	Minimum	2.6	Minimum				0.956					
	Maximum	49.5	Maximum				3.902					
	Second Largest	44.5	Second Largest				3.795					
	First Quartile	11	First Quartile				2.398					
	Median	15.8	Median				2.76					
	Third Quartile	23.75	Third Quartile				3.167					
	Mean	17.93	Mean				2.672					
	SD	10.64	SD				0.723					
	Coefficient of Variation	0.594										
	Skewness	0.74										
	Background Statistics											
	Normal Distribution Test					Lognormal Distribution Test						
	Lilliefors Test Statistic	0.0909	Lilliefors Test Statistic				0.117					
	Lilliefors Critical Value	0.0826	Lilliefors Critical Value				0.0826					
	Data not Normal at 5% Significance Level					Data not Lognormal at 5% Significance Level						
	Assuming Normal Distribution					Assuming Lognormal Distribution						
	95% UTL with 90% Coverage	33.95	95% UTL with 90% Coverage				42.98					
	95% UPL (t)	35.65	95% UPL (t)				48.23					
	90% Percentile (z)	31.56	90% Percentile (z)				36.54					
	95% Percentile (z)	35.43	95% Percentile (z)				47.51					
	99% Percentile (z)	42.68	99% Percentile (z)				77.76					
	Gamma Distribution Test					Data Distribution Test						
	k star	2.43	Data appear Gamma Distributed at 5% Significance Level									
	Theta Star	7.379										
	MLE of Mean	17.93										
	MLE of Standard Deviation	11.5										
	nu star	558.8										
	A-D Test Statistic	0.752	Nonparametric Statistics									
	5% A-D Critical Value	0.762	90% Percentile				33.16					
	K-S Test Statistic	0.0766	95% Percentile				36.95					
	5% K-S Critical Value	0.0864	99% Percentile				44.43					
	Data appear Gamma Distributed at 5% Significance Level											
	Assuming Gamma Distribution					95% UTL with 90% Coverage				35.8		
	90% Percentile	33.33	95% Percentile Bootstrap UTL with 90% Coverage				35.8					
	95% Percentile	40.03	95% BCA Bootstrap UTL with 90% Coverage				35.8					
	99% Percentile	54.74	95% UPL				38.82					
			95% Chebyshev UPL				64.51					
	95% WH Approx. Gamma UPL	40.17	Upper Threshold Limit Based upon IQR				42.88					

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

General Statistics										
Total Number of Observations				100	Number of Distinct Observations				85	
Tolerance Factor				1.524						
Raw Statistics					Log-Transformed Statistics					
Minimum				1880	Minimum				7.539	
Maximum				4580	Maximum				8.429	
Second Largest				4510	Second Largest				8.414	
First Quartile				2515	First Quartile				7.83	
Median				2845	Median				7.953	
Third Quartile				3253	Third Quartile				8.087	
Mean				2892	Mean				7.952	
SD				550.6	SD				0.189	
Coefficient of Variation				0.19						
Skewness				0.563						
Background Statistics										
Normal Distribution Test					Lognormal Distribution Test					
Lilliefors Test Statistic				0.0473	Lilliefors Test Statistic				0.0373	
Lilliefors Critical Value				0.0886	Lilliefors Critical Value				0.0886	
Data appear Normal at 5% Significance Level					Data appear Lognormal at 5% Significance Level					
Assuming Normal Distribution					Assuming Lognormal Distribution					
95% UTL with 90% Coverage				3731	95% UTL with 90% Coverage				3789	
95% UPL (t)				3811	95% UPL (t)				3894	
90% Percentile (z)				3598	90% Percentile (z)				3619	
95% Percentile (z)				3798	95% Percentile (z)				3876	
99% Percentile (z)				4173	99% Percentile (z)				4408	
Gamma Distribution Test					Data Distribution Test					
k star				27.66	Data appear Normal at 5% Significance Level					
Theta Star				104.6						
MLE of Mean				2892						
MLE of Standard Deviation				549.9						
nu star				5532						
A-D Test Statistic				0.165	Nonparametric Statistics					
5% A-D Critical Value				0.75	90% Percentile				3541	
K-S Test Statistic				0.0396	95% Percentile				3852	
5% K-S Critical Value				0.0892	99% Percentile				4511	
Data appear Gamma Distributed at 5% Significance Level										
Assuming Gamma Distribution					95% UTL with 90% Coverage					3630
90% Percentile				3616	95% Percentile Bootstrap UTL with 90% Coverage				3652	
95% Percentile				3852	95% BCA Bootstrap UTL with 90% Coverage				3652	
99% Percentile				4323	95% UPL				3888	
					95% Chebyshev UPL				5304	
95% WH Approx. Gamma UPL				3858	Upper Threshold Limit Based upon IQR				4359	
95% HW Approx. Gamma UPL				3866						
95% WH Approx. Gamma UTL with 90% Coverage				3763						
95% HW Approx. Gamma UTL with 90% Coverage				3769						
M MG/KG MAGNESIUM (so_ss)										
General Statistics										
Number of Valid Data				115	Number of Detected Data				110	
Number of Distinct Detected Data				82	Number of Non-Detect Data				5	
Tolerance Factor				1.506	Percent Non-Detects				4.35%	
Raw Statistics					Log-transformed Statistics					
Minimum Detected				555	Minimum Detected				6.319	
Maximum Detected				2930	Maximum Detected				7.983	

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

	M MG/KG MANGANESE (br_na)											
	General Statistics											
	Total Number of Observations				30		Number of Distinct Observations				30	
	Tolerance Factor				1.777							
	Raw Statistics						Log-Transformed Statistics					
	Minimum				13.9		Minimum				2.632	
	Maximum				3830		Maximum				8.251	
	Second Largest				3680		Second Largest				8.211	
	First Quartile				211		First Quartile				5.352	
	Median				349.5		Median				5.853	
	Third Quartile				611.3		Third Quartile				6.414	
	Mean				716.7		Mean				5.832	
	SD				969.7		SD				1.338	
	Coefficient of Variation				1.353							
	Skewness				2.312							
	Background Statistics											
	Normal Distribution Test						Lognormal Distribution Test					
	Shapiro Wilk Test Statistic				0.661		Shapiro Wilk Test Statistic				0.946	
	Shapiro Wilk Critical Value				0.927		Shapiro Wilk Critical Value				0.927	
	Data not Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level					
	Assuming Normal Distribution						Assuming Lognormal Distribution					
	95% UTL with 90% Coverage				2440		95% UTL with 90% Coverage				3678	
	95% UPL (t)				2392		95% UPL (t)				3441	
	90% Percentile (z)				1959		90% Percentile (z)				1896	
	95% Percentile (z)				2312		95% Percentile (z)				3082	
	99% Percentile (z)				2973		99% Percentile (z)				7672	
	Gamma Distribution Test						Data Distribution Test					
	k star				0.742		Data appear Lognormal at 5% Significance Level					
	Theta Star				966.1							
	MLE of Mean				716.7							
	MLE of Standard Deviation				832.1							
	nu star				44.51							
	A-D Test Statistic						Nonparametric Statistics					
	5% A-D Critical Value				0.785		90% Percentile				1689	
	K-S Test Statistic				0.193		95% Percentile				2902	
	5% K-S Critical Value				0.166		99% Percentile				3787	
	Data not Gamma Distributed at 5% Significance Level											
	Assuming Gamma Distribution						95% UTL with 90% Coverage					
	90% Percentile				1775		95% Percentile Bootstrap UTL with 90% Coverage				3695	
	95% Percentile				2389		95% BCA Bootstrap UTL with 90% Coverage				3695	
	99% Percentile				3849		95% UPL				3748	
							95% Chebyshev UPL				5014	
	95% WH Approx. Gamma UPL				2371		Upper Threshold Limit Based upon IQR					
	95% HW Approx. Gamma UPL				2467							
	95% WH Approx. Gamma UTL with 90% Coverage				2459							
	95% HW Approx. Gamma UTL with 90% Coverage				2570							
	M MG/KG MANGANESE (so_sb)											
	General Statistics											
	Total Number of Observations				100		Number of Distinct Observations				94	
	Tolerance Factor				1.524							
	Raw Statistics						Log-Transformed Statistics					

Table 2
ProUCL Output

				Minimum	157					Minimum	5.056	
				Maximum	1750					Maximum	7.467	
				Second Largest	1520					Second Largest	7.326	
				First Quartile	255.8					First Quartile	5.544	
				Median	332.5					Median	5.807	
				Third Quartile	477.5					Third Quartile	6.168	
				Mean	423.8					Mean	5.911	
				SD	277.6					SD	0.488	
				Coefficient of Variation	0.655							
				Skewness	2.679							
				Background Statistics								
				Normal Distribution Test				Lognormal Distribution Test				
				Lilliefors Test Statistic	0.194			Lilliefors Test Statistic	0.0988			
				Lilliefors Critical Value	0.0886			Lilliefors Critical Value	0.0886			
				Data not Normal at 5% Significance Level				Data not Lognormal at 5% Significance Level				
				Assuming Normal Distribution				Assuming Lognormal Distribution				
				95% UTL with 90% Coverage	846.9			95% UTL with 90% Coverage	777			
				95% UPL (t)	887.1			95% UPL (t)	833.8			
				90% Percentile (z)	779.6			90% Percentile (z)	690.2			
				95% Percentile (z)	880.5			95% Percentile (z)	824.2			
				99% Percentile (z)	1070			99% Percentile (z)	1150			
				Gamma Distribution Test				Data Distribution Test				
				k star	3.672			Data do not follow a Discernable Distribution (0.05)				
				Theta Star	115.4							
				MLE of Mean	423.8							
				MLE of Standard Deviation	221.2							
				nu star	734.5							
				A-D Test Statistic	3.049			Nonparametric Statistics				
				5% A-D Critical Value	0.757			90% Percentile	652.2			
				K-S Test Statistic	0.126			95% Percentile	984			
				5% K-S Critical Value	0.0898			99% Percentile	1522			
				Data not Gamma Distributed at 5% Significance Level								
				Assuming Gamma Distribution				95% UTL with 90% Coverage	850			
				90% Percentile	720.3			95% Percentile Bootstrap UTL with 90% Coverage	863.1			
				95% Percentile	840.6			95% BCA Bootstrap UTL with 90% Coverage	863.1			
				99% Percentile	1099			95% UPL	1037			
								95% Chebyshev UPL	1640			
				95% WH Approx. Gamma UPL	837.2			Upper Threshold Limit Based upon IQR				
				95% HW Approx. Gamma UPL	834.7							
				95% WH Approx. Gamma UTL with 90% Coverage	788.5							
				95% HW Approx. Gamma UTL with 90% Coverage	784.3							
				M MG/KG MANGANESE (so_ss)								
				General Statistics								
				Total Number of Observations	115			Number of Distinct Observations	100			
				Tolerance Factor	1.506							
				Raw Statistics				Log-Transformed Statistics				
				Minimum	27.9			Minimum	3.329			
				Maximum	477			Maximum	6.168			
				Second Largest	454			Second Largest	6.118			
				First Quartile	102.5			First Quartile	4.63			
				Median	136			Median	4.913			
				Third Quartile	197			Third Quartile	5.283			
				Mean	165.7			Mean	4.971			
				SD	92.61			SD	0.531			

Table 2
ProUCL Output

	Coefficient of Variation		0.559						
	Skewness		1.37						
	Background Statistics								
	Normal Distribution Test				Lognormal Distribution Test				
	Lilliefors Test Statistic		0.144	Lilliefors Test Statistic		0.0555			
	Lilliefors Critical Value		0.0826	Lilliefors Critical Value		0.0826			
	Data not Normal at 5% Significance Level				Data appear Lognormal at 5% Significance Level				
	Assuming Normal Distribution				Assuming Lognormal Distribution				
	95% UTL with 90% Coverage		305.1	95% UTL with 90% Coverage		320.6			
	95% UPL (t)		319.9	95% UPL (t)		348.9			
	90% Percentile (z)		284.3	90% Percentile (z)		284.5			
	95% Percentile (z)		318	95% Percentile (z)		345.1			
	99% Percentile (z)		381.1	99% Percentile (z)		495.5			
	Gamma Distribution Test				Data Distribution Test				
	k star		3.655	Data appear Lognormal at 5% Significance Level					
	Theta Star		45.32						
	MLE of Mean		165.7						
	MLE of Standard Deviation		86.65						
	nu star		840.6						
	A-D Test Statistic		0.931	Nonparametric Statistics					
	5% A-D Critical Value		0.757	90% Percentile		293.6			
	K-S Test Statistic		0.0902	95% Percentile		373			
	5% K-S Critical Value		0.086	99% Percentile		451.1			
	Data not Gamma Distributed at 5% Significance Level								
	Assuming Gamma Distribution				95% UTL with 90% Coverage		342		
	90% Percentile		281.8	95% Percentile Bootstrap UTL with 90% Coverage		342			
	95% Percentile		329	95% BCA Bootstrap UTL with 90% Coverage		342			
	99% Percentile		430.1	95% UPL		378.8			
				95% Chebyshev UPL		571.1			
	95% WH Approx. Gamma UPL		329.3	Upper Threshold Limit Based upon IQR		338.8			
	95% HW Approx. Gamma UPL		332.7						
	95% WH Approx. Gamma UTL with 90% Coverage		308.1						
	95% HW Approx. Gamma UTL with 90% Coverage		310.2						
	M MG/KG MERCURY (br_na)								
	General Statistics								
	Number of Valid Data		30	Number of Detected Data		0			
	Number of Distinct Detected Data		0	Number of Non-Detect Data		30			
	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).								
	The data set for variable M MG/KG MERCURY (br_na) was not processed!								
	M MG/KG MERCURY (so_sb)								
	General Statistics								
	Number of Valid Data		100	Number of Detected Data		5			
	Number of Distinct Detected Data		5	Number of Non-Detect Data		95			
	Tolerance Factor		1.524	Percent Non-Detects		95.00%			
	Raw Statistics				Log-transformed Statistics				
	Minimum Detected		0.013	Minimum Detected		-4.343			

Table 2
ProUCL Output

					Maximum Detected	0.022					Maximum Detected	-3.817
					Mean of Detected	0.0177					Mean of Detected	-4.051
					SD of Detected	0.0036					SD of Detected	0.209
					Minimum Non-Detect	0.011					Minimum Non-Detect	-4.51
					Maximum Non-Detect	0.02					Maximum Non-Detect	-3.912
					Data with Multiple Detection Limits						Single Detection Limit Scenario	
					Note: Data have multiple DLs - Use of KM Method is recommen						Number treated as Non-Detect with Single DL	98
					For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL	2
					Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage	98.00%
					Warning: There are only 5 Detected Values in this data							
					Note: It should be noted that even though bootstrap may be performed on this data set							
					the resulting calculations may not be reliable enough to draw conclusions							
					It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.							
					Background Statistics							
					Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only	
					Shapiro Wilk Test Statistic	0.964					Shapiro Wilk Test Statistic	0.961
					5% Shapiro Wilk Critical Value	0.762					5% Shapiro Wilk Critical Value	0.762
					Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level	
					Assuming Normal Distribution						Assuming Lognormal Distribution	
					DL/2 Substitution Method						DL/2 Substitution Method	
					Mean	0.00748					Mean (Log Scale)	-4.929
					SD	0.00257					SD (Log Scale)	0.229
					95% UTL 90% Coverage	0.0114					95% UTL 90% Coverage	0.0103
					95% UPL (t)	0.0118					95% UPL (t)	0.0106
					90% Percentile (z)	0.0108					90% Percentile (z)	0.0097
					95% Percentile (z)	0.0117					95% Percentile (z)	0.0105
					99% Percentile (z)	0.0135					99% Percentile (z)	0.0123
					Maximum Likelihood Estimate(MLE) Method	N/A					Log ROS Method	
											Mean in Original Scale	0.00599
											SD in Original Scale	0.00362
											Mean in Log Scale	-5.259
											SD in Log Scale	0.521
											95% UTL 90% Coverage	0.0115
											95% UPL (t)	0.0124
											90% Percentile (z)	0.0101
											95% Percentile (z)	0.0123
											99% Percentile (z)	0.0175
					Gamma Distribution Test with Detected Values Only						Data Distribution Test with Detected Values Only	
					k star (bias corrected)	11.88					Data appear Normal at 5% Significance Level	
					Theta Star	0.00149						
					nu star	118.8						
					A-D Test Statistic	0.236					Nonparametric Statistics	
					5% A-D Critical Value	0.679					Kaplan-Meier (KM) Method	
					K-S Test Statistic	0.21					Mean	0.0132
					5% K-S Critical Value	0.357					SD	0.00125
					Data appear Gamma Distributed at 5% Significance Level						SE of Mean	0.00014
											95% KM UTL with 90% Coverage	0.0152
					Assuming Gamma Distribution						95% KM Chebyshev UPL	0.0187
					Gamma ROS Statistics with Extrapolated Data						95% KM UPL (t)	0.0153
					Mean	0.00099					90% Percentile (z)	0.0148
					Median	1E-06					95% Percentile (z)	0.0153
					SD	0.00399					99% Percentile (z)	0.0162
					k star	0.13						
					Theta star	0.00764					Gamma ROS Limits with Extrapolated Data	
					Nu star	26.04					95% Wilson Hilferty (WH) Approx. Gamma UPL	0.00195

Table 2
ProUCL Output

		95% Percentile of Chisquare (2k)	1.469			95% Hawkins Wixley (HW) Approx. Gamma UPL	0.00123					
						95% WH Approx. Gamma UTL with 90% Coverage	0.00158					
		90% Percentile	0.00288			95% HW Approx. Gamma UTL with 90% Coverage	0.00096					
		95% Percentile	0.00561									
		99% Percentile	0.0138									
		Note: DL/2 is not a recommended method.										
		M MG/KG MERCURY (so_ss)										
		General Statistics										
		Number of Valid Data	115			Number of Detected Data	66					
		Number of Distinct Detected Data	43			Number of Non-Detect Data	49					
		Tolerance Factor	1.506			Percent Non-Detects	42.61%					
		Raw Statistics					Log-transformed Statistics					
		Minimum Detected	0.016			Minimum Detected	-4.135					
		Maximum Detected	0.68			Maximum Detected	-0.386					
		Mean of Detected	0.0718			Mean of Detected	-2.995					
		SD of Detected	0.0918			SD of Detected	0.767					
		Minimum Non-Detect	0.011			Minimum Non-Detect	-4.51					
		Maximum Non-Detect	0.22			Maximum Non-Detect	-1.514					
		Data with Multiple Detection Limits					Single Detection Limit Scenario					
		Note: Data have multiple DLs - Use of KM Method is recommended for all methods (except KM, DL/2, and ROS Methods),					Number treated as Non-Detect with Single DL	112				
		Observations < Largest ND are treated as NDs					Number treated as Detected with Single DL	3				
							Single DL Non-Detect Percentage	97.39%				
		Background Statistics										
		Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only					
		Lilliefors Test Statistic	0.272			Lilliefors Test Statistic	0.158					
		5% Lilliefors Critical Value	0.109			5% Lilliefors Critical Value	0.109					
		Data not Normal at 5% Significance Level					Data not Lognormal at 5% Significance Level					
		Assuming Normal Distribution					Assuming Lognormal Distribution					
		DL/2 Substitution Method				DL/2 Substitution Method						
		Mean	0.0543			Mean (Log Scale)	-3.353					
		SD	0.0739			SD (Log Scale)	0.93					
		95% UTL 90% Coverage	0.166			95% UTL 90% Coverage	0.142					
		95% UPL (t)	0.177			95% UPL (t)	0.165					
		90% Percentile (z)	0.149			90% Percentile (z)	0.115					
		95% Percentile (z)	0.176			95% Percentile (z)	0.162					
		99% Percentile (z)	0.226			99% Percentile (z)	0.305					
		Maximum Likelihood Estimate(MLE) Method					Log ROS Method					
		Mean	0.529			Mean in Original Scale	0.05					
		SD	0.203			SD in Original Scale	0.0741					
		95% UTL with 90% Coverage	0.834			95% UTL with 90% Coverage	0.115					
						95% BCA UTL with 90% Coverage	0.13					
						95% Bootstrap (%) UTL with 90% Coverage	0.132					
		95% UPL (t)	0.867			95% UPL (t)	0.132					
		90% Percentile (z)	0.789			90% Percentile (z)	0.0954					
		95% Percentile (z)	0.862			95% Percentile (z)	0.129					
		99% Percentile (z)	1.001			99% Percentile (z)	0.229					
		Gamma Distribution Test with Detected Values Only					Data Distribution Test with Detected Values Only					
		k star (bias corrected)	1.47			Data do not follow a Discernable Distribution (0.05)						
		Theta Star	0.0489									
		nu star	194									
		A-D Test Statistic					Nonparametric Statistics					
		5% A-D Critical Value	0.769			Kaplan-Meier (KM) Method						
		K-S Test Statistic	0.201			Mean	0.0523					

Table 2
ProUCL Output

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Table 2
ProUCL Output

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Table 2
ProUCL Output

	95% HW Approx. Gamma UTL with 90% Coverage	26.92										
	M MG/KG NICKEL (so_ss)											
	General Statistics											
	Total Number of Observations	115		Number of Distinct Observations	74							
	Tolerance Factor	1.506										
	Raw Statistics						Log-Transformed Statistics					
	Minimum	2.8		Minimum	1.03							
	Maximum	19.1		Maximum	2.95							
	Second Largest	16.5		Second Largest	2.803							
	First Quartile	6.9		First Quartile	1.931							
	Median	8.9		Median	2.186							
	Third Quartile	11.5		Third Quartile	2.442							
	Mean	9.252		Mean	2.164							
	SD	3.163		SD	0.36							
	Coefficient of Variation	0.342										
	Skewness	0.401										
	Background Statistics											
	Normal Distribution Test						Lognormal Distribution Test					
	Lilliefors Test Statistic	0.0693		Lilliefors Test Statistic	0.0803							
	Lilliefors Critical Value	0.0826		Lilliefors Critical Value	0.0826							
	Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level					
	Assuming Normal Distribution						Assuming Lognormal Distribution					
	95% UTL with 90% Coverage	14.02		95% UTL with 90% Coverage	14.96							
	95% UPL (t)	14.52		95% UPL (t)	15.84							
	90% Percentile (z)	13.31		90% Percentile (z)	13.8							
	95% Percentile (z)	14.45		95% Percentile (z)	15.73							
	99% Percentile (z)	16.61		99% Percentile (z)	20.1							
	Gamma Distribution Test						Data Distribution Test					
	k star	8.125		Data appear Normal at 5% Significance Level								
	Theta Star	1.139										
	MLE of Mean	9.252										
	MLE of Standard Deviation	3.246										
	nu star	1869										
	A-D Test Statistic	0.605		Nonparametric Statistics								
	5% A-D Critical Value	0.753		90% Percentile	13.78							
	K-S Test Statistic	0.0799		95% Percentile	14.43							
	5% K-S Critical Value	0.0856		99% Percentile	16.29							
	Data appear Gamma Distributed at 5% Significance Level											
	Assuming Gamma Distribution						95% UTL with 90% Coverage	14.4				
	90% Percentile	13.58		95% Percentile Bootstrap UTL with 90% Coverage	14.4							
	95% Percentile	15.16		95% BCA Bootstrap UTL with 90% Coverage	14.36							
	99% Percentile	18.42		95% UPL	14.54							
				95% Chebyshev UPL	23.1							
	95% WH Approx. Gamma UPL	15.2		Upper Threshold Limit Based upon IQR	18.4							
	95% HW Approx. Gamma UPL	15.33										
	95% WH Approx. Gamma UTL with 90% Coverage	14.49										
	95% HW Approx. Gamma UTL with 90% Coverage	14.59										
	M MG/KG POTASSIUM (br_na)											
	General Statistics											
	Number of Valid Data	30		Number of Detected Data	28							

Table 2
ProUCL Output

	Number of Distinct Detected Data			28	Number of Non-Detect Data			2	
	Tolerance Factor			1.777	Percent Non-Detects			6.67%	
	Raw Statistics				Log-transformed Statistics				
	Minimum Detected			53.9	Minimum Detected			3.987	
	Maximum Detected			537	Maximum Detected			6.286	
	Mean of Detected			176.2	Mean of Detected			4.975	
	SD of Detected			119.1	SD of Detected			0.63	
	Minimum Non-Detect			48.8	Minimum Non-Detect			3.888	
	Maximum Non-Detect			50.5	Maximum Non-Detect			3.922	
	Data with Multiple Detection Limits				Single Detection Limit Scenario				
	Note: Data have multiple DLs - Use of KM Method is recommen				Number treated as Non-Detect with Single DL				2
	For all methods (except KM, DL/2, and ROS Methods),				Number treated as Detected with Single DL				28
	Observations < Largest ND are treated as NDs				Single DL Non-Detect Percentage				6.67%
	Background Statistics								
	Normal Distribution Test with Detected Values Only				Lognormal Distribution Test with Detected Values Only				
	Shapiro Wilk Test Statistic			0.857	Shapiro Wilk Test Statistic			0.961	
	5% Shapiro Wilk Critical Value			0.924	5% Shapiro Wilk Critical Value			0.924	
	Data not Normal at 5% Significance Level				Data appear Lognormal at 5% Significance Level				
	Assuming Normal Distribution				Assuming Lognormal Distribution				
	DL/2 Substitution Method				DL/2 Substitution Method				
	Mean			166.1	Mean (Log Scale)			4.858	
	SD			121.1	SD (Log Scale)			0.755	
	95% UTL 90% Coverage			381.4	95% UTL 90% Coverage			492	
	95% UPL (t)			375.3	95% UPL (t)			473.9	
	90% Percentile (z)			321.3	90% Percentile (z)			338.6	
	95% Percentile (z)			365.4	95% Percentile (z)			445.3	
	99% Percentile (z)			447.9	99% Percentile (z)			744.8	
	Maximum Likelihood Estimate(MLE) Method				Log ROS Method				
	Mean			163.3	Mean in Original Scale			166.6	
	SD			123.6	SD in Original Scale			120.5	
	95% UTL with 90% Coverage			383	95% UTL with 90% Coverage			467.9	
					95% BCA UTL with 90% Coverage			403.8	
					95% Bootstrap (%) UTL with 90% Coverage			403.8	
	95% UPL (t)			376.9	95% UPL (t)			451.5	
	90% Percentile (z)			321.8	90% Percentile (z)			328.1	
	95% Percentile (z)			366.7	95% Percentile (z)			425.7	
	99% Percentile (z)			451	99% Percentile (z)			693.5	
	Gamma Distribution Test with Detected Values Only				Data Distribution Test with Detected Values Only				
	k star (bias corrected)			2.436	Data appear Gamma Distributed at 5% Significance Level				
	Theta Star			72.32					
	nu star			136.4					
	A-D Test Statistic			0.561	Nonparametric Statistics				
	5% A-D Critical Value			0.755	Kaplan-Meier (KM) Method				
	K-S Test Statistic			0.136	Mean			168	
	5% K-S Critical Value			0.167	SD			117	
	Data appear Gamma Distributed at 5% Significance Level				SE of Mean				21.76
					95% KM UTL with 90% Coverage				376
	Assuming Gamma Distribution				95% KM Chebyshev UPL				686.5
	Gamma ROS Statistics with Extrapolated Data				95% KM UPL (t)			370.1	
	Mean			164.4	90% Percentile (z)			318	
	Median			125	95% Percentile (z)			360.5	
	SD			123.3	99% Percentile (z)			440.2	
	k star			0.441					
	Theta star			372.8	Gamma ROS Limits with Extrapolated Data				
	Nu star			26.47	95% Wilson Hilferty (WH) Approx. Gamma UPL			521.1	
	95% Percentile of Chisquare (2k)			3.543	95% Hawkins Wixley (HW) Approx. Gamma UPL			661.2	
					95% WH Approx. Gamma UTL with 90% Coverage				538.3

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

	General Statistics								
	Number of Valid Data	115		Number of Detected Data	75				
	Number of Distinct Detected Data	69		Number of Non-Detect Data	40				
	Tolerance Factor	1.506		Percent Non-Detects	34.78%				
	Raw Statistics			Log-transformed Statistics					
	Minimum Detected	216		Minimum Detected	5.375				
	Maximum Detected	877		Maximum Detected	6.777				
	Mean of Detected	438.8		Mean of Detected	6.043				
	SD of Detected	133.6		SD of Detected	0.286				
	Minimum Non-Detect	179		Minimum Non-Detect	5.187				
	Maximum Non-Detect	615		Maximum Non-Detect	6.422				
	Data with Multiple Detection Limits			Single Detection Limit Scenario					
	Note: Data have multiple DLs - Use of KM Method is recommen			Number treated as Non-Detect with Single DL		108			
	For all methods (except KM, DL/2, and ROS Methods),			Number treated as Detected with Single DL		7			
	Observations < Largest ND are treated as NDs			Single DL Non-Detect Percentage		93.91%			
	Background Statistics								
	Normal Distribution Test with Detected Values Only			Lognormal Distribution Test with Detected Values Only					
	Lilliefors Test Statistic	0.089		Lilliefors Test Statistic	0.0503				
	5% Lilliefors Critical Value	0.102		5% Lilliefors Critical Value	0.102				
	Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level					
	Assuming Normal Distribution			Assuming Lognormal Distribution					
	DL/2 Substitution Method			DL/2 Substitution Method					
	Mean	335.2		Mean (Log Scale)	5.648				
	SD	180.6		SD (Log Scale)	0.612				
	95% UTL 90% Coverage	607.2		95% UTL 90% Coverage	712.4				
	95% UPL (t)	636		95% UPL (t)	785.3				
	90% Percentile (z)	566.6		90% Percentile (z)	621				
	95% Percentile (z)	632.2		95% Percentile (z)	775.4				
	99% Percentile (z)	755.3		99% Percentile (z)	1176				
	Maximum Likelihood Estimate(MLE) Method			Log ROS Method					
	Mean	164		Mean in Original Scale	368.5				
	SD	292.4		SD in Original Scale	145.7				
	95% UTL with 90% Coverage	604.5		95% UTL with 90% Coverage	597.9				
				95% BCA UTL with 90% Coverage	576				
				95% Bootstrap (%) UTL with 90% Coverage	576				
	95% UPL (t)	651.1		95% UPL (t)	633.9				
	90% Percentile (z)	538.8		90% Percentile (z)	550.5				
	95% Percentile (z)	645		95% Percentile (z)	629.2				
	99% Percentile (z)	844.3		99% Percentile (z)	808.2				
	Gamma Distribution Test with Detected Values Only			Data Distribution Test with Detected Values Only					
	k star (bias corrected)	11.74		Data appear Normal at 5% Significance Level					
	Theta Star	37.38							
	nu star	1761							
	A-D Test Statistic	0.506		Nonparametric Statistics					
	5% A-D Critical Value	0.75		Kaplan-Meier (KM) Method					
	K-S Test Statistic	0.0591		Mean	367				
	5% K-S Critical Value	0.103		SD	147.9				
	Data appear Gamma Distributed at 5% Significance Level			SE of Mean	14.04				
				95% KM UTL with 90% Coverage	589.9				
	Assuming Gamma Distribution			95% KM Chebyshev UPL	1015				
	Gamma ROS Statistics with Extrapolated Data			95% KM UPL (t)	613.4				
	Mean	306		90% Percentile (z)	556.6				
	Median	335		95% Percentile (z)	610.4				
	SD	218.3		99% Percentile (z)	711.2				
	k star	0.193							
	Theta star	1589		Gamma ROS Limits with Extrapolated Data					

Table 2
ProUCL Output

				Nu star	44.28			95% Wilson Hilferty (WH) Approx. Gamma UPL		1237				
				95% Percentile of Chisquare (2k)	2.003			95% Hawkins Wixley (HW) Approx. Gamma UPL		1744				
								95% WH Approx. Gamma UTL with 90% Coverage		1076				
				90% Percentile	925			95% HW Approx. Gamma UTL with 90% Coverage		1453				
				95% Percentile	1592									
				99% Percentile	3441									
				Note: DL/2 is not a recommended method.										
				M MG/KG SELENIUM (br_na)										
				General Statistics										
				Number of Valid Data	30			Number of Detected Data		1				
				Number of Distinct Detected Data	1			Number of Non-Detect Data		29				
				Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! Tested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EP										
				The data set for variable M MG/KG SELENIUM (br_na) was not processed!										
				M MG/KG SELENIUM (so_sb)										
				General Statistics										
				Number of Valid Data	100			Number of Detected Data		5				
				Number of Distinct Detected Data	5			Number of Non-Detect Data		95				
				Tolerance Factor	1.524			Percent Non-Detects		95.00%				
				Raw Statistics				Log-transformed Statistics						
				Minimum Detected	0.222			Minimum Detected		-1.505				
				Maximum Detected	0.71			Maximum Detected		-0.342				
				Mean of Detected	0.437			Mean of Detected		-0.91				
				SD of Detected	0.195			SD of Detected		0.457				
				Minimum Non-Detect	0.15			Minimum Non-Detect		-1.897				
				Maximum Non-Detect	0.585			Maximum Non-Detect		-0.536				
				Data with Multiple Detection Limits				Single Detection Limit Scenario						
				Note: Data have multiple DLs - Use of KM Method is recommended				Number treated as Non-Detect with Single DL					99	
				For all methods (except KM, DL/2, and ROS Methods),				Number treated as Detected with Single DL					1	
				Observations < Largest ND are treated as NDs				Single DL Non-Detect Percentage					99.00%	
				Warning: There are only 5 Detected Values in this data										
				Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions										
				It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.										
				Background Statistics										
				Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only					
				Shapiro Wilk Test Statistic	0.942			Shapiro Wilk Test Statistic		0.968				
				5% Shapiro Wilk Critical Value	0.762			5% Shapiro Wilk Critical Value		0.762				
				Data appear Normal at 5% Significance Level					Data appear Lognormal at 5% Significance Level					
				Assuming Normal Distribution					Assuming Lognormal Distribution					
				DL/2 Substitution Method				DL/2 Substitution Method						
				Mean	0.138			Mean (Log Scale)		-2.093				
				SD	0.0889			SD (Log Scale)		0.42				
				95% UTL 90% Coverage	0.273			95% UTL 90% Coverage		0.234				
				95% UPL (t)	0.286			95% UPL (t)		0.248				
				90% Percentile (z)	0.251			90% Percentile (z)		0.211				
				95% Percentile (z)	0.284			95% Percentile (z)		0.246				

Table 2
ProUCL Output

				99% Percentile (z)	0.344					99% Percentile (z)	0.327	
				Maximum Likelihood Estimate(MLE) Method	N/A					Log ROS Method		
										Mean in Original Scale	0.0619	
										SD in Original Scale	0.1	
										Mean in Log Scale	-3.319	
										SD in Log Scale	0.942	
										95% UTL 90% Coverage	0.152	
										95% UPL (t)	0.174	
										90% Percentile (z)	0.121	
										95% Percentile (z)	0.171	
										99% Percentile (z)	0.324	
				Gamma Distribution Test with Detected Values Only						Data Distribution Test with Detected Values Only		
				k star (bias corrected)	2.636					Data appear Normal at 5% Significance Level		
				Theta Star	0.166							
				nu star	26.36							
				A-D Test Statistic	0.25					Nonparametric Statistics		
				5% A-D Critical Value	0.68					Kaplan-Meier (KM) Method		
				K-S Test Statistic	0.23					Mean	0.233	
				5% K-S Critical Value	0.358					SD	0.0613	
				Data appear Gamma Distributed at 5% Significance Level						SE of Mean	0.00689	
										95% KM UTL with 90% Coverage	0.326	
				Assuming Gamma Distribution						95% KM Chebyshev UPL	0.501	
				Gamma ROS Statistics with Extrapolated Data						95% KM UPL (t)	0.335	
				Mean	0.0218					90% Percentile (z)	0.312	
				Median	1E-06					95% Percentile (z)	0.334	
				SD	0.103					99% Percentile (z)	0.376	
				k star	0.0923							
				Theta star	0.237					Gamma ROS Limits with Extrapolated Data		
				Nu star	18.45					95% Wilson Hilferty (WH) Approx. Gamma UPL	0.0322	
				95% Percentile of Chisquare (2k)	1.075					95% Hawkins Wixley (HW) Approx. Gamma UPL	0.0155	
										95% WH Approx. Gamma UTL with 90% Coverage	0.0256	
				90% Percentile	0.0561					95% HW Approx. Gamma UTL with 90% Coverage	0.0116	
				95% Percentile	0.127							
				99% Percentile	0.361							
				Note: DL/2 is not a recommended method.								
				M MG/KG SELENIUM (so_ss)								
				General Statistics								
				Number of Valid Data	115					Number of Detected Data	45	
				Number of Distinct Detected Data	29					Number of Non-Detect Data	70	
				Tolerance Factor	1.506					Percent Non-Detects	60.87%	
				Raw Statistics						Log-transformed Statistics		
				Minimum Detected	0.18					Log Statistics Not Available		
				Maximum Detected	0.89							
				Mean of Detected	0.386							
				Mean of Detected	0.386							
				Mean of Detected	0.386							
				Maximum Non-Detect	5.7							
				Data with Multiple Detection Limits						Single Detection Limit Scenario		
				Note: Data have multiple DLs - Use of KM Method is recommen						Number treated as Non-Detect with Single DL	115	
				For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL	0	
				Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage	100.00%	
				Background Statistics								
				Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only		
				Shapiro Wilk Test Statistic	0.899					Not Available		

Table 2
ProUCL Output

5% Shapiro Wilk Critical Value		0.945		
Data not Normal at 5% Significance Level				
Assuming Normal Distribution			Assuming Lognormal Distribution	
DL/2 Substitution Method			DL/2 Substitution Method	
Mean		-85.99	N/A	
SD		656.5		
95% UTL 90% Coverage		902.9		
95% UPL (t)		1007		
90% Percentile (z)		755.4		
95% Percentile (z)		993.9		
99% Percentile (z)		1441		
Maximum Likelihood Estimate(MLE) Method		N/A	Log ROS Method	
Gamma Distribution Test with Detected Values Only			Data Distribution Test with Detected Values Only	
Gamma Statistics Not Available			Data appear Gamma Distributed at 5% Significance Level	
			Nonparametric Statistics	
			Kaplan-Meier (KM) Method	
			Mean	
			SD	
			SE of Mean	
			95% KM UTL with 90% Coverage	
			95% KM Chebyshev UPL	
			95% KM UPL (t)	
			90% Percentile (z)	
			95% Percentile (z)	
			99% Percentile (z)	
Note: DL/2 is not a recommended method.				
M MG/KG SILVER (br_na)				
General Statistics				
Number of Valid Data		30	Number of Detected Data	
Number of Distinct Detected Data		3	Number of Non-Detect Data	
Warning: Data set has only 3 Detected Values.				
This is not enough to compute meaningful and reliable test statistics and estimates.				
No statistics will be produced!				
Tolerance Factor		1.777	Percent Non-Detects	
			90.00%	
Raw Statistics			Log-transformed Statistics	
Minimum Detected		0.0805	Minimum Detected	
Maximum Detected		0.095	Maximum Detected	
Mean of Detected		0.0868	Mean of Detected	
SD of Detected		0.00742	SD of Detected	
Minimum Non-Detect		0.048	Minimum Non-Detect	
Maximum Non-Detect		0.48	Maximum Non-Detect	
Data with Multiple Detection Limits			Single Detection Limit Scenario	
Note: Data have multiple DLs - Use of KM Method is recommen			Number treated as Non-Detect with Single DL	
For all methods (except KM, DL/2, and ROS Methods),			Number treated as Detected with Single DL	
Observations < Largest ND are treated as NDs			Single DL Non-Detect Percentage	
Warning: There are only 3 Distinct Detected Values in this data set				
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.				
Those methods will return a 'N/A' value on your output display!				
It is necessary to have 4 or more Distinct Values for bootstrap methods.				

Table 2
ProUCL Output

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!													
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!													
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV),													
The data set for variable M MG/KG SILVER (so_sb) was not processed!													
M MG/KG SILVER (so_ss)													
General Statistics													
Number of Valid Data				115	Number of Detected Data				0				
Number of Distinct Detected Data				0	Number of Non-Detect Data				115				
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!													
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!													
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV),													
The data set for variable M MG/KG SILVER (so_ss) was not processed!													
M MG/KG SODIUM (br_na)													
General Statistics													
Number of Valid Data				30	Number of Detected Data				24				
Number of Distinct Detected Data				24	Number of Non-Detect Data				6				
Tolerance Factor				1.777	Percent Non-Detects				20.00%				
Raw Statistics						Log-transformed Statistics							
Minimum Detected				62.4	Minimum Detected				4.134				
Maximum Detected				354	Maximum Detected				5.869				
Mean of Detected				160.4	Mean of Detected				4.951				
SD of Detected				85.2	SD of Detected				0.51				
Minimum Non-Detect				48.3	Minimum Non-Detect				3.877				
Maximum Non-Detect				50.5	Maximum Non-Detect				3.922				
Data with Multiple Detection Limits						Single Detection Limit Scenario							
Note: Data have multiple DLs - Use of KM Method is recommended						Number treated as Non-Detect with Single DL				6			
For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL				24			
Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage				20.00%			
Background Statistics													
Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only							
Shapiro Wilk Test Statistic				0.887	Shapiro Wilk Test Statistic				0.96				
5% Shapiro Wilk Critical Value				0.916	5% Shapiro Wilk Critical Value				0.916				
Data not Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level							
Assuming Normal Distribution						Assuming Lognormal Distribution							
DL/2 Substitution Method					DL/2 Substitution Method								
Mean				133.2	Mean (Log Scale)				4.601				
SD				93.88	SD (Log Scale)				0.845				
95% UTL 90% Coverage				300	95% UTL 90% Coverage				447				
95% UPL (t)				295.4	95% UPL (t)				428.6				
90% Percentile (z)				253.5	90% Percentile (z)				294				
95% Percentile (z)				287.6	95% Percentile (z)				399.7				
99% Percentile (z)				351.6	99% Percentile (z)				711.1				
Maximum Likelihood Estimate(MLE) Method						Log ROS Method							
Mean				126.4	Mean in Original Scale				137.2				
SD				103.4	SD in Original Scale				89.38				
95% UTL with 90% Coverage				310.1	95% UTL with 90% Coverage				359.7				
					95% BCA UTL with 90% Coverage				344.1				
					95% Bootstrap (%) UTL with 90% Coverage				344.1				

Table 2
ProUCL Output

			95% UPL (t)	305					95% UPL (t)	348.2		
			90% Percentile (z)	258.9					90% Percentile (z)	259.8		
			95% Percentile (z)	296.5					95% Percentile (z)	329.8		
			99% Percentile (z)	367					99% Percentile (z)	516		
			Gamma Distribution Test with Detected Values Only						Data Distribution Test with Detected Values Only			
			k star (bias corrected)	3.622					Data appear Gamma Distributed at 5% Significance Level			
			Theta Star	44.28								
			nu star	173.9								
			A-D Test Statistic	0.466					Nonparametric Statistics			
			5% A-D Critical Value	0.748					Kaplan-Meier (KM) Method			
			K-S Test Statistic	0.138					Mean			
			5% K-S Critical Value	0.179					SD			
			Data appear Gamma Distributed at 5% Significance Level						SE of Mean			
									95% KM UTL with 90% Coverage			
			Assuming Gamma Distribution						95% KM Chebyshev UPL			
			Gamma ROS Statistics with Extrapolated Data						95% KM UPL (t)			
			Mean						90% Percentile (z)			
			Median						95% Percentile (z)			
			SD						99% Percentile (z)			
			k star									
			Theta star						Gamma ROS Limits with Extrapolated Data			
			Nu star						95% Wilson Hilferty (WH) Approx. Gamma UPL			
			95% Percentile of Chisquare (2k)						95% Hawkins Wixley (HW) Approx. Gamma UPL			
									95% WH Approx. Gamma UTL with 90% Coverage			
			90% Percentile						95% HW Approx. Gamma UTL with 90% Coverage			
			95% Percentile									
			99% Percentile									
			Note: DL/2 is not a recommended method.									
			M MG/KG SODIUM (so_sb)									
			General Statistics									
			Number of Valid Data						Number of Detected Data			
			Number of Distinct Detected Data						Number of Non-Detect Data			
			Tolerance Factor						Percent Non-Detects			
			Raw Statistics						Log-transformed Statistics			
			Minimum Detected						Minimum Detected			
			Maximum Detected						Maximum Detected			
			Mean of Detected						Mean of Detected			
			SD of Detected						SD of Detected			
			Minimum Non-Detect						Minimum Non-Detect			
			Maximum Non-Detect						Maximum Non-Detect			
			Data with Multiple Detection Limits						Single Detection Limit Scenario			
			Note: Data have multiple DLs - Use of KM Method is recommended						Number treated as Non-Detect with Single DL			
			For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL			
			Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage			
			Background Statistics									
			Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only			
			Shapiro Wilk Test Statistic						Shapiro Wilk Test Statistic			
			5% Shapiro Wilk Critical Value						5% Shapiro Wilk Critical Value			
			Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level			
			Assuming Normal Distribution						Assuming Lognormal Distribution			
			DL/2 Substitution Method						DL/2 Substitution Method			
			Mean						Mean (Log Scale)			
			SD						SD (Log Scale)			
			95% UTL 90% Coverage						95% UTL 90% Coverage			

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

Background Statistics									
Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only				
Shapiro Wilk Test Statistic					0.898				
5% Shapiro Wilk Critical Value					0.918				
Data not Normal at 5% Significance Level									
Assuming Normal Distribution					Assuming Lognormal Distribution				
DL/2 Substitution Method					DL/2 Substitution Method				
Mean					-1145				
SD					2198				
95% UTL 90% Coverage					2165				
95% UPL (t)					2515				
90% Percentile (z)					1671				
95% Percentile (z)					2470				
99% Percentile (z)					3968				
Maximum Likelihood Estimate(MLE) Method					N/A				
					Log ROS Method				
					N/A				
Gamma Distribution Test with Detected Values Only					Data Distribution Test with Detected Values Only				
Gamma Statistics Not Available					Data follow Appr. Gamma Distribution at 5% Significance Level				
Nonparametric Statistics									
Kaplan-Meier (KM) Method									
Mean					88.71				
SD					85.62				
SE of Mean					6.489				
95% KM UTL with 90% Coverage					217.7				
95% KM Chebyshev UPL					463.5				
95% KM UPL (t)					231.3				
90% Percentile (z)					198.4				
95% Percentile (z)					229.5				
99% Percentile (z)					287.9				
Note: DL/2 is not a recommended method.									
M MG/KG THALLIUM (br_na)									
General Statistics									
Number of Valid Data					30				
Number of Distinct Detected Data					0				
					Number of Detected Data				
					0				
					Number of Non-Detect Data				
					30				
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!									
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!									
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).									
The data set for variable M MG/KG THALLIUM (br_na) was not processed!									
M MG/KG THALLIUM (so_sb)									
General Statistics									
Number of Valid Data					100				
Number of Distinct Detected Data					0				
					Number of Detected Data				
					0				
					Number of Non-Detect Data				
					100				
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!									
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!									
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).									
The data set for variable M MG/KG THALLIUM (so_sb) was not processed!									

Table 2
ProUCL Output

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Table 2
ProUCL Output

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Table 2
ProUCL Output

General Statistics									
Total Number of Observations		115	Number of Distinct Observations		91				
Tolerance Factor		1.506							
Raw Statistics					Log-Transformed Statistics				
Minimum		5.2	Minimum		1.649				
Maximum		35.8	Maximum		3.578				
Second Largest		35.2	Second Largest		3.561				
First Quartile		14.65	First Quartile		2.684				
Median		20.9	Median		3.04				
Third Quartile		26.3	Third Quartile		3.27				
Mean		20.49	Mean		2.922				
SD		7.966	SD		0.485				
Coefficient of Variation		0.389							
Skewness		-0.133							
Background Statistics									
Normal Distribution Test					Lognormal Distribution Test				
Lilliefors Test Statistic		0.0544	Lilliefors Test Statistic		0.14				
Lilliefors Critical Value		0.0826	Lilliefors Critical Value		0.0826				
Data appear Normal at 5% Significance Level					Data not Lognormal at 5% Significance Level				
Assuming Normal Distribution					Assuming Lognormal Distribution				
95% UTL with 90% Coverage		32.49	95% UTL with 90% Coverage		38.53				
95% UPL (t)		33.76	95% UPL (t)		41.62				
90% Percentile (z)		30.7	90% Percentile (z)		34.56				
95% Percentile (z)		33.59	95% Percentile (z)		41.21				
99% Percentile (z)		39.02	99% Percentile (z)		57.33				
Gamma Distribution Test					Data Distribution Test				
k star		5.126	Data appear Normal at 5% Significance Level						
Theta Star		3.997							
MLE of Mean		20.49							
MLE of Standard Deviation		9.049							
nu star		1179							
A-D Test Statistic		2.161	Nonparametric Statistics						
5% A-D Critical Value		0.754	90% Percentile		30.72				
K-S Test Statistic		0.114	95% Percentile		33.86				
5% K-S Critical Value		0.0857	99% Percentile		35.16				
Data not Gamma Distributed at 5% Significance Level									
Assuming Gamma Distribution					95% UTL with 90% Coverage				
90% Percentile		32.6	95% Percentile Bootstrap UTL with 90% Coverage		31.5				
95% Percentile		37.28	95% BCA Bootstrap UTL with 90% Coverage		32.64				
99% Percentile		47.15	95% UPL		34.02				
95% WH Approx. Gamma UPL		37.43	95% Chebyshev UPL		55.36				
95% HW Approx. Gamma UPL		38.24	Upper Threshold Limit Based upon IQR		43.78				
95% WH Approx. Gamma UTL with 90% Coverage		35.33							
95% HW Approx. Gamma UTL with 90% Coverage		35.96							
M MG/KG ZINC (br_na)									
General Statistics									
Total Number of Observations		30	Number of Distinct Observations		30				
Tolerance Factor		1.777							
Raw Statistics					Log-Transformed Statistics				
Minimum		2.9	Minimum		1.065				
Maximum		125	Maximum		4.828				

Table 2
ProUCL Output

			Second Largest	87					Second Largest	4.466		
			First Quartile	34.65					First Quartile	3.544		
			Median	51.7					Median	3.944		
			Third Quartile	64.5					Third Quartile	4.167		
			Mean	52.83					Mean	3.8		
			SD	25.75					SD	0.705		
			Coefficient of Variation	0.487								
			Skewness	0.548								
			Background Statistics									
			Normal Distribution Test					Lognormal Distribution Test				
			Shapiro Wilk Test Statistic	0.972				Shapiro Wilk Test Statistic	0.826			
			Shapiro Wilk Critical Value	0.927				Shapiro Wilk Critical Value	0.927			
			Data appear Normal at 5% Significance Level					Data not Lognormal at 5% Significance Level				
			Assuming Normal Distribution					Assuming Lognormal Distribution				
			95% UTL with 90% Coverage	98.58				95% UTL with 90% Coverage	156.5			
			95% UPL (t)	97.3				95% UPL (t)	151.1			
			90% Percentile (z)	85.82				90% Percentile (z)	110.3			
			95% Percentile (z)	95.17				95% Percentile (z)	142.6			
			99% Percentile (z)	112.7				99% Percentile (z)	230.5			
			Gamma Distribution Test					Data Distribution Test				
			k star	2.862				Data appear Normal at 5% Significance Level				
			Theta Star	18.46								
			MLE of Mean	52.83								
			MLE of Standard Deviation	31.23								
			nu star	171.7								
			A-D Test Statistic	0.573				Nonparametric Statistics				
			5% A-D Critical Value	0.752				90% Percentile	84.27			
			K-S Test Statistic	0.115				95% Percentile	86.87			
			5% K-S Critical Value	0.161				99% Percentile	114			
			Data appear Gamma Distributed at 5% Significance Level									
			Assuming Gamma Distribution					95% UTL with 90% Coverage	87			
			90% Percentile	94.69				95% Percentile Bootstrap UTL with 90% Coverage	90.8			
			95% Percentile	112.4				95% BCA Bootstrap UTL with 90% Coverage	90.8			
			99% Percentile	150.8				95% UPL	104.1			
								95% Chebyshev UPL	166.9			
			95% WH Approx. Gamma UPL	114				Upper Threshold Limit Based upon IQR	109.3			
			95% HW Approx. Gamma UPL	119.4								
			95% WH Approx. Gamma UTL with 90% Coverage	116.5								
			95% HW Approx. Gamma UTL with 90% Coverage	122.3								
			M MG/KG ZINC (so_sb)									
			General Statistics									
			Total Number of Observations	100				Number of Distinct Observations	93			
			Tolerance Factor	1.524								
			Raw Statistics					Log-Transformed Statistics				
			Minimum	18.7				Minimum	2.929			
			Maximum	74.5				Maximum	4.311			
			Second Largest	72.1				Second Largest	4.278			
			First Quartile	30.83				First Quartile	3.428			
			Median	38.75				Median	3.657			
			Third Quartile	51.2				Third Quartile	3.936			
			Mean	41.23				Mean	3.671			
			SD	13.04				SD	0.311			
			Coefficient of Variation	0.316								
			Skewness	0.642								

Table 2
ProUCL Output

Background Statistics													
Normal Distribution Test						Lognormal Distribution Test							
Lilliefors Test Statistic						0.108	Lilliefors Test Statistic						0.0794
Lilliefors Critical Value						0.0886	Lilliefors Critical Value						0.0886
Data not Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level							
Assuming Normal Distribution													
95% UTL with 90% Coverage						61.1	95% UTL with 90% Coverage						63.1
95% UPL (t)						62.99	95% UPL (t)						66
90% Percentile (z)						57.94	90% Percentile (z)						58.52
95% Percentile (z)						62.68	95% Percentile (z)						65.52
99% Percentile (z)						71.56	99% Percentile (z)						80.97
Gamma Distribution Test													
k star						10.26	Data appear Lognormal at 5% Significance Level						
Theta Star						4.019							
MLE of Mean						41.23							
MLE of Standard Deviation						12.87							
nu star						2051							
A-D Test Statistic													
5% A-D Critical Value						0.752	90% Percentile						60.95
K-S Test Statistic						0.0919	95% Percentile						63.22
5% K-S Critical Value						0.0894	99% Percentile						72.12
Data not Gamma Distributed at 5% Significance Level													
Assuming Gamma Distribution													
95% UTL with 90% Coverage						61.6	95% UTL with 90% Coverage						61.6
90% Percentile						58.35	95% Percentile Bootstrap UTL with 90% Coverage						61.76
95% Percentile						64.43	95% BCA Bootstrap UTL with 90% Coverage						62.39
99% Percentile						76.91	95% UPL						63.58
95% WH Approx. Gamma UPL						64.59	95% Chebyshev UPL						98.35
95% HW Approx. Gamma UPL						64.9	Upper Threshold Limit Based upon IQR						81.76
95% WH Approx. Gamma UTL with 90% Coverage						62.14							
95% HW Approx. Gamma UTL with 90% Coverage						62.34							
M MG/KG ZINC (so_ss)													
General Statistics													
Total Number of Observations						115	Number of Distinct Observations						103
Tolerance Factor						1.506							
Raw Statistics						Log-Transformed Statistics							
Minimum						10.5	Minimum						2.351
Maximum						93.7	Maximum						4.54
Second Largest						84.4	Second Largest						4.436
First Quartile						21.05	First Quartile						3.047
Median						30.4	Median						3.414
Third Quartile						40.25	Third Quartile						3.695
Mean						33.9	Mean						3.421
SD						16.34	SD						0.447
Coefficient of Variation						0.482							
Skewness						1.281							
Background Statistics													
Normal Distribution Test						Lognormal Distribution Test							
Lilliefors Test Statistic						0.116	Lilliefors Test Statistic						0.0779
Lilliefors Critical Value						0.0826	Lilliefors Critical Value						0.0826
Data not Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level							
Assuming Normal Distribution													
Assuming Lognormal Distribution													

Table 2
ProUCL Output

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Table 2
ProUCL Output

General Statistics													
Number of Valid Data						40	Number of Detected Data						0
Number of Distinct Detected Data						0	Number of Non-Detect Data						40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).													
The data set for variable OS UG/KG 1,1-BIPHENYL (so_ss) was not processed!													
OS UG/KG 2,2'-OXYBIS(1-CHLOROPROPANE) (br_na)													
General Statistics													
Total Number of Observations						0	Number of Distinct Observations						0
Tolerance Factor						N/A	Number of Missing Values						30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG 2,2'-OXYBIS(1-CHLOROPROPANE) (br_na) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG 2,2'-OXYBIS(1-CHLOROPROPANE) (so_sb)													
General Statistics													
Total Number of Observations						0	Number of Distinct Observations						0
Tolerance Factor						N/A	Number of Missing Values						100
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG 2,2'-OXYBIS(1-CHLOROPROPANE) (so_sb) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG 2,2'-OXYBIS(1-CHLOROPROPANE) (so_ss)													
General Statistics													
Number of Valid Data						40	Number of Detected Data						0
Number of Distinct Detected Data						0	Number of Non-Detect Data						40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).													
The data set for variable OS UG/KG 2,2'-OXYBIS(1-CHLOROPROPANE) (so_ss) was not processed!													
OS UG/KG 2,4,5-TRICHLOROPHENOL (br_na)													
General Statistics													
Total Number of Observations						0	Number of Distinct Observations						0
Tolerance Factor						N/A	Number of Missing Values						30

Table 2
ProUCL Output

Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 2,4,5-TRICHLOROPHENOL (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 2,4,5-TRICHLOROPHENOL (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 2,4,5-TRICHLOROPHENOL (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 2,4,5-TRICHLOROPHENOL (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).			
The data set for variable OS UG/KG 2,4,5-TRICHLOROPHENOL (so_ss) was not processed!			
OS UG/KG 2,4,6-TRICHLOROPHENOL (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 2,4,6-TRICHLOROPHENOL (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 2,4,6-TRICHLOROPHENOL (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100

Table 2
ProUCL Output

Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 2,4,6-TRICHLOROPHENOL (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 2,4,6-TRICHLOROPHENOL (so_ss)			
General Statistics			
Number of Valid Data		40	Number of Detected Data
Number of Distinct Detected Data		0	Number of Non-Detect Data
			40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG 2,4,6-TRICHLOROPHENOL (so_ss) was not processed!			
OS UG/KG 2,4-DICHLOROPHENOL (br_na)			
General Statistics			
Total Number of Observations		0	Number of Distinct Observations
Tolerance Factor		N/A	Number of Missing Values
			30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 2,4-DICHLOROPHENOL (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 2,4-DICHLOROPHENOL (so_sb)			
General Statistics			
Total Number of Observations		0	Number of Distinct Observations
Tolerance Factor		N/A	Number of Missing Values
			100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 2,4-DICHLOROPHENOL (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 2,4-DICHLOROPHENOL (so_ss)			
General Statistics			
Number of Valid Data		40	Number of Detected Data
Number of Distinct Detected Data		0	Number of Non-Detect Data
			40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			

Table 2
ProUCL Output

The data set for variable OS UG/KG 2,4-DICHLOROPHENOL (so_ss) was not processed!					
OS UG/KG 2,4-DIMETHYLPHENOL (br_na)					
General Statistics					
Total Number of Observations		0	Number of Distinct Observations	0	
Tolerance Factor		N/A	Number of Missing Values		30
Warning: This data set only has 0 observations!					
Data set is too small to compute reliable and meaningful statistics and estimates!					
The data set for variable OS UG/KG 2,4-DIMETHYLPHENOL (br_na) was not processed!					
It is suggested to collect at least 8 to 10 observations before using these statistical methods!					
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
OS UG/KG 2,4-DIMETHYLPHENOL (so_sb)					
General Statistics					
Total Number of Observations		0	Number of Distinct Observations		0
Tolerance Factor		N/A	Number of Missing Values		100
Warning: This data set only has 0 observations!					
Data set is too small to compute reliable and meaningful statistics and estimates!					
The data set for variable OS UG/KG 2,4-DIMETHYLPHENOL (so_sb) was not processed!					
It is suggested to collect at least 8 to 10 observations before using these statistical methods!					
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
OS UG/KG 2,4-DIMETHYLPHENOL (so_ss)					
General Statistics					
Number of Valid Data		40	Number of Detected Data		0
Number of Distinct Detected Data		0	Number of Non-Detect Data		40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!					
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!					
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).					
The data set for variable OS UG/KG 2,4-DIMETHYLPHENOL (so_ss) was not processed!					
OS UG/KG 2,4-DINITROPHENOL (br_na)					
General Statistics					
Total Number of Observations		0	Number of Distinct Observations		0
Tolerance Factor		N/A	Number of Missing Values		30
Warning: This data set only has 0 observations!					
Data set is too small to compute reliable and meaningful statistics and estimates!					
The data set for variable OS UG/KG 2,4-DINITROPHENOL (br_na) was not processed!					
It is suggested to collect at least 8 to 10 observations before using these statistical methods!					
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					

Table 2
ProUCL Output

OS UG/KG 2,4-DINITROPHENOL (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 2,4-DINITROPHENOL (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 2,4-DINITROPHENOL (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG 2,4-DINITROPHENOL (so_ss) was not processed!			
OS UG/KG 2,4-DINITROTOLUENE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 2,4-DINITROTOLUENE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 2,4-DINITROTOLUENE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 2,4-DINITROTOLUENE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			

Table 2
ProUCL Output

OS UG/KG 2,4-DINITROTOLUENE (so_ss)					
General Statistics					
Number of Valid Data		40	Number of Detected Data	0	
Number of Distinct Detected Data		0	Number of Non-Detect Data		40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV),					
The data set for variable OS UG/KG 2,4-DINITROTOLUENE (so_ss) was not processed!					
OS UG/KG 2,6-DINITROTOLUENE (br_na)					
General Statistics					
Total Number of Observations		0	Number of Distinct Observations		0
Tolerance Factor		N/A	Number of Missing Values		30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG 2,6-DINITROTOLUENE (br_na) was not processed!					
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
OS UG/KG 2,6-DINITROTOLUENE (so_sb)					
General Statistics					
Total Number of Observations		0	Number of Distinct Observations		0
Tolerance Factor		N/A	Number of Missing Values		100
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG 2,6-DINITROTOLUENE (so_sb) was not processed!					
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
OS UG/KG 2,6-DINITROTOLUENE (so_ss)					
General Statistics					
Number of Valid Data		40	Number of Detected Data		0
Number of Distinct Detected Data		0	Number of Non-Detect Data		40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV),					
The data set for variable OS UG/KG 2,6-DINITROTOLUENE (so_ss) was not processed!					
OS UG/KG 2-CHLORONAPHTHALENE (br_na)					
General Statistics					

Table 2
ProUCL Output

Total Number of Observations				0	Number of Distinct Observations				0				
Tolerance Factor				N/A	Number of Missing Values				30				
Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable OS UG/KG 2-CHLORONAPHTHALENE (br_na) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG 2-CHLORONAPHTHALENE (so_sb)													
General Statistics													
Total Number of Observations				0	Number of Distinct Observations				0				
Tolerance Factor				N/A	Number of Missing Values				100				
Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable OS UG/KG 2-CHLORONAPHTHALENE (so_sb) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG 2-CHLORONAPHTHALENE (so_ss)													
General Statistics													
Number of Valid Data				40	Number of Detected Data				0				
Number of Distinct Detected Data				0	Number of Non-Detect Data				40				
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!													
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!													
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).													
The data set for variable OS UG/KG 2-CHLORONAPHTHALENE (so_ss) was not processed!													
OS UG/KG 2-CHLOROPHENOL (br_na)													
General Statistics													
Total Number of Observations				0	Number of Distinct Observations				0				
Tolerance Factor				N/A	Number of Missing Values				30				
Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable OS UG/KG 2-CHLOROPHENOL (br_na) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG 2-CHLOROPHENOL (so_sb)													
General Statistics													
Total Number of Observations				0	Number of Distinct Observations				0				
Tolerance Factor				N/A	Number of Missing Values				100				

Table 2
ProUCL Output

Warning: This data set only has 0 observations!					
Data set is too small to compute reliable and meaningful statistics and estimates!					
The data set for variable OS UG/KG 2-CHLOROPHENOL (so_sb) was not processed!					
It is suggested to collect at least 8 to 10 observations before using these statistical methods!					
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
OS UG/KG 2-CHLOROPHENOL (so_ss)					
General Statistics					
Number of Valid Data		40	Number of Detected Data	0	
Number of Distinct Detected Data		0	Number of Non-Detect Data 40		
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!					
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!					
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV)					
The data set for variable OS UG/KG 2-CHLOROPHENOL (so_ss) was not processed!					
OS UG/KG 2-METHYLNAPHTHALENE (br_na)					
General Statistics					
Total Number of Observations		0	Number of Distinct Observations		0
Tolerance Factor		N/A	Number of Missing Values		30
Warning: This data set only has 0 observations!					
Data set is too small to compute reliable and meaningful statistics and estimates!					
The data set for variable OS UG/KG 2-METHYLNAPHTHALENE (br_na) was not processed!					
It is suggested to collect at least 8 to 10 observations before using these statistical methods!					
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
OS UG/KG 2-METHYLNAPHTHALENE (so_sb)					
General Statistics					
Total Number of Observations		0	Number of Distinct Observations		0
Tolerance Factor		N/A	Number of Missing Values		100
Warning: This data set only has 0 observations!					
Data set is too small to compute reliable and meaningful statistics and estimates!					
The data set for variable OS UG/KG 2-METHYLNAPHTHALENE (so_sb) was not processed!					
It is suggested to collect at least 8 to 10 observations before using these statistical methods!					
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
OS UG/KG 2-METHYLNAPHTHALENE (so_ss)					
General Statistics					
Number of Valid Data		40	Number of Detected Data		0
Number of Distinct Detected Data		0	Number of Non-Detect Data		40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!					

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

OS UG/KG 2-NITROPHENOL (so_ss)					
General Statistics					
Number of Valid Data		40	Number of Detected Data	0	
Number of Distinct Detected Data		0	Number of Non-Detect Data		40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).					
The data set for variable OS UG/KG 2-NITROPHENOL (so_ss) was not processed!					
OS UG/KG 3,3'-DICHLOROBENZIDINE (br_na)					
General Statistics					
Total Number of Observations		0	Number of Distinct Observations		0
Tolerance Factor		N/A	Number of Missing Values		30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG 3,3'-DICHLOROBENZIDINE (br_na) was not processed! It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
OS UG/KG 3,3'-DICHLOROBENZIDINE (so_sb)					
General Statistics					
Total Number of Observations		0	Number of Distinct Observations		0
Tolerance Factor		N/A	Number of Missing Values		100
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG 3,3'-DICHLOROBENZIDINE (so_sb) was not processed! It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.					
OS UG/KG 3,3'-DICHLOROBENZIDINE (so_ss)					
General Statistics					
Number of Valid Data		40	Number of Detected Data		0
Number of Distinct Detected Data		0	Number of Non-Detect Data		40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).					
The data set for variable OS UG/KG 3,3'-DICHLOROBENZIDINE (so_ss) was not processed!					
OS UG/KG 3-NITROANILINE (br_na)					

Table 2
ProUCL Output

General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG 3-NITROANILINE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 3-NITROANILINE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG 3-NITROANILINE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 3-NITROANILINE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG 3-NITROANILINE (so_ss) was not processed!			
OS UG/KG 4,6-DINITRO-2-METHYLPHENOL (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG 4,6-DINITRO-2-METHYLPHENOL (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 4,6-DINITRO-2-METHYLPHENOL (so_sb)			
General Statistics			

Table 2
ProUCL Output

Total Number of Observations				0	Number of Distinct Observations				0				
Tolerance Factor				N/A	Number of Missing Values				100				
Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable OS UG/KG 4,6-DINITRO-2-METHYLPHENOL (so_sb) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG 4,6-DINITRO-2-METHYLPHENOL (so_ss)													
General Statistics													
Number of Valid Data				40	Number of Detected Data				0				
Number of Distinct Detected Data				0	Number of Non-Detect Data				40				
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!													
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!													
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).													
The data set for variable OS UG/KG 4,6-DINITRO-2-METHYLPHENOL (so_ss) was not processed!													
OS UG/KG 4-BROMOPHENYL PHENYL ETHER (br_na)													
General Statistics													
Total Number of Observations				0	Number of Distinct Observations				0				
Tolerance Factor				N/A	Number of Missing Values				30				
Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable OS UG/KG 4-BROMOPHENYL PHENYL ETHER (br_na) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG 4-BROMOPHENYL PHENYL ETHER (so_sb)													
General Statistics													
Total Number of Observations				0	Number of Distinct Observations				0				
Tolerance Factor				N/A	Number of Missing Values				100				
Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable OS UG/KG 4-BROMOPHENYL PHENYL ETHER (so_sb) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG 4-BROMOPHENYL PHENYL ETHER (so_ss)													
General Statistics													
Number of Valid Data				40	Number of Detected Data				0				
Number of Distinct Detected Data				0	Number of Non-Detect Data				40				

Table 2
ProUCL Output

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
The data set for variable OS UG/KG 4-BROMOPHENYL PHENYL ETHER (so_ss) was not processed!											
OS UG/KG 4-CHLORO-3-METHYLPHENOL (br_na)											
General Statistics											
Total Number of Observations					0	Number of Distinct Observations					0
Tolerance Factor					N/A	Number of Missing Values					30
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG 4-CHLORO-3-METHYLPHENOL (br_na) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG 4-CHLORO-3-METHYLPHENOL (so_sb)											
General Statistics											
Total Number of Observations					0	Number of Distinct Observations					0
Tolerance Factor					N/A	Number of Missing Values					100
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG 4-CHLORO-3-METHYLPHENOL (so_sb) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG 4-CHLORO-3-METHYLPHENOL (so_ss)											
General Statistics											
Number of Valid Data					40	Number of Detected Data					0
Number of Distinct Detected Data					0	Number of Non-Detect Data					40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
The data set for variable OS UG/KG 4-CHLORO-3-METHYLPHENOL (so_ss) was not processed!											
OS UG/KG 4-CHLOROANILINE (br_na)											
General Statistics											
Total Number of Observations					0	Number of Distinct Observations					0
Tolerance Factor					N/A	Number of Missing Values					30
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											

Table 2
ProUCL Output

The data set for variable OS UG/KG 4-CHLOROANILINE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 4-CHLOROANILINE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 4-CHLOROANILINE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 4-CHLOROANILINE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).			
The data set for variable OS UG/KG 4-CHLOROANILINE (so_ss) was not processed!			
OS UG/KG 4-CHLOROPHENYL PHENYL ETHER (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 4-CHLOROPHENYL PHENYL ETHER (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 4-CHLOROPHENYL PHENYL ETHER (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 4-CHLOROPHENYL PHENYL ETHER (so_sb) was not processed!			

Table 2
ProUCL Output

It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 4-CHLOROPHENYL PHENYL ETHER (so_ss)			
General Statistics			
Number of Valid Data		40	Number of Detected Data
Number of Distinct Detected Data		0	Number of Non-Detect Data
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).			
The data set for variable OS UG/KG 4-CHLOROPHENYL PHENYL ETHER (so_ss) was not processed!			
OS UG/KG 4-METHYLPHENOL (br_na)			
General Statistics			
Total Number of Observations		0	Number of Distinct Observations
Tolerance Factor		N/A	Number of Missing Values
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 4-METHYLPHENOL (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 4-METHYLPHENOL (so_sb)			
General Statistics			
Total Number of Observations		0	Number of Distinct Observations
Tolerance Factor		N/A	Number of Missing Values
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 4-METHYLPHENOL (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 4-METHYLPHENOL (so_ss)			
General Statistics			
Number of Valid Data		40	Number of Detected Data
Number of Distinct Detected Data		0	Number of Non-Detect Data
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).			
The data set for variable OS UG/KG 4-METHYLPHENOL (so_ss) was not processed!			

Table 2
ProUCL Output

OS UG/KG 4-NITROANILINE (br_na)									
General Statistics									
Total Number of Observations				0	Number of Distinct Observations				0
Tolerance Factor				N/A	Number of Missing Values				30
Warning: This data set only has 0 observations!									
Data set is too small to compute reliable and meaningful statistics and estimates!									
The data set for variable OS UG/KG 4-NITROANILINE (br_na) was not processed!									
It is suggested to collect at least 8 to 10 observations before using these statistical methods!									
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.									
OS UG/KG 4-NITROANILINE (so_sb)									
General Statistics									
Total Number of Observations				0	Number of Distinct Observations				0
Tolerance Factor				N/A	Number of Missing Values				100
Warning: This data set only has 0 observations!									
Data set is too small to compute reliable and meaningful statistics and estimates!									
The data set for variable OS UG/KG 4-NITROANILINE (so_sb) was not processed!									
It is suggested to collect at least 8 to 10 observations before using these statistical methods!									
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.									
OS UG/KG 4-NITROANILINE (so_ss)									
General Statistics									
Number of Valid Data				40	Number of Detected Data				0
Number of Distinct Detected Data				0	Number of Non-Detect Data				40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!									
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!									
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV),									
The data set for variable OS UG/KG 4-NITROANILINE (so_ss) was not processed!									
OS UG/KG 4-NITROPHENOL (br_na)									
General Statistics									
Total Number of Observations				0	Number of Distinct Observations				0
Tolerance Factor				N/A	Number of Missing Values				30
Warning: This data set only has 0 observations!									
Data set is too small to compute reliable and meaningful statistics and estimates!									
The data set for variable OS UG/KG 4-NITROPHENOL (br_na) was not processed!									
It is suggested to collect at least 8 to 10 observations before using these statistical methods!									
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.									
OS UG/KG 4-NITROPHENOL (so_sb)									

Table 2
ProUCL Output

General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG 4-NITROPHENOL (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG 4-NITROPHENOL (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV)			
The data set for variable OS UG/KG 4-NITROPHENOL (so_ss) was not processed!			
OS UG/KG ACENAPHTHENE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG ACENAPHTHENE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG ACENAPHTHENE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG ACENAPHTHENE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG ACENAPHTHENE (so_ss)			
General Statistics			

Table 2
ProUCL Output

Number of Valid Data				40	Number of Detected Data				0
Number of Distinct Detected Data				0	Number of Non-Detect Data				40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!									
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!									
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).									
The data set for variable OS UG/KG ACENAPHTHENE (so_ss) was not processed!									
OS UG/KG ACENAPHTHYLENE (br_na)									
General Statistics									
Total Number of Observations				0	Number of Distinct Observations				0
Tolerance Factor				N/A	Number of Missing Values				30
Warning: This data set only has 0 observations!									
Data set is too small to compute reliable and meaningful statistics and estimates!									
The data set for variable OS UG/KG ACENAPHTHYLENE (br_na) was not processed!									
It is suggested to collect at least 8 to 10 observations before using these statistical methods!									
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.									
OS UG/KG ACENAPHTHYLENE (so_sb)									
General Statistics									
Total Number of Observations				0	Number of Distinct Observations				0
Tolerance Factor				N/A	Number of Missing Values				100
Warning: This data set only has 0 observations!									
Data set is too small to compute reliable and meaningful statistics and estimates!									
The data set for variable OS UG/KG ACENAPHTHYLENE (so_sb) was not processed!									
It is suggested to collect at least 8 to 10 observations before using these statistical methods!									
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.									
OS UG/KG ACENAPHTHYLENE (so_ss)									
General Statistics									
Number of Valid Data				40	Number of Detected Data				0
Number of Distinct Detected Data				0	Number of Non-Detect Data				40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!									
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!									
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).									
The data set for variable OS UG/KG ACENAPHTHYLENE (so_ss) was not processed!									
OS UG/KG ACETOPHENONE (br_na)									
General Statistics									
Total Number of Observations				0	Number of Distinct Observations				0
Tolerance Factor				N/A	Number of Missing Values				30

Table 2
ProUCL Output

Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG ACETOPHENONE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG ACETOPHENONE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG ACETOPHENONE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG ACETOPHENONE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG ACETOPHENONE (so_ss) was not processed!			
OS UG/KG ANTHRACENE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG ANTHRACENE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG ANTHRACENE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			

Table 2
ProUCL Output

The data set for variable OS UG/KG ANTHRACENE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG ANTHRACENE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG ANTHRACENE (so_ss) was not processed!			
OS UG/KG ATRAZINE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG ATRAZINE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG ATRAZINE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG ATRAZINE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG ATRAZINE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG ATRAZINE (so_ss) was not processed!			

Table 2
ProUCL Output

OS UG/KG BENZALDEHYDE (br_na)									
General Statistics									
Total Number of Observations				0	Number of Distinct Observations				0
Tolerance Factor				N/A	Number of Missing Values				30
Warning: This data set only has 0 observations!									
Data set is too small to compute reliable and meaningful statistics and estimates!									
The data set for variable OS UG/KG BENZALDEHYDE (br_na) was not processed!									
It is suggested to collect at least 8 to 10 observations before using these statistical methods!									
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.									
OS UG/KG BENZALDEHYDE (so_sb)									
General Statistics									
Total Number of Observations				0	Number of Distinct Observations				0
Tolerance Factor				N/A	Number of Missing Values				100
Warning: This data set only has 0 observations!									
Data set is too small to compute reliable and meaningful statistics and estimates!									
The data set for variable OS UG/KG BENZALDEHYDE (so_sb) was not processed!									
It is suggested to collect at least 8 to 10 observations before using these statistical methods!									
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.									
OS UG/KG BENZALDEHYDE (so_ss)									
General Statistics									
Number of Valid Data				40	Number of Detected Data				11
Number of Distinct Detected Data				10	Number of Non-Detect Data				29
Tolerance Factor				1.69	Percent Non-Detects				72.50%
Number of Missing Values				75					
Raw Statistics					Log-transformed Statistics				
Minimum Detected				59	Minimum Detected				4.078
Maximum Detected				150	Maximum Detected				5.011
Mean of Detected				89.27	Mean of Detected				4.436
SD of Detected				32.42	SD of Detected				0.343
Minimum Non-Detect				170	Minimum Non-Detect				5.136
Maximum Non-Detect				310	Maximum Non-Detect				5.737
Data with Multiple Detection Limits					Single Detection Limit Scenario				
Note: Data have multiple DLs - Use of KM Method is recommended for all methods (except KM, DL/2, and ROS Methods), Observations < Largest ND are treated as NDs					Number treated as Non-Detect with Single DL				40
					Number treated as Detected with Single DL				0
					Single DL Non-Detect Percentage				100.00%
Background Statistics									
Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only				
Shapiro Wilk Test Statistic				0.848	Shapiro Wilk Test Statistic				0.871
5% Shapiro Wilk Critical Value				0.85	5% Shapiro Wilk Critical Value				0.85
Data not Normal at 5% Significance Level					Data appear Lognormal at 5% Significance Level				
Assuming Normal Distribution					Assuming Lognormal Distribution				
DL/2 Substitution Method					DL/2 Substitution Method				

Table 2
ProUCL Output

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Table 2
ProUCL Output

General Statistics													
Total Number of Observations				0		Number of Distinct Observations				0			
Tolerance Factor				N/A		Number of Missing Values				100			
Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable OS UG KG BENZO(A)ANTHRACENE (so_sb) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG KG BENZO(A)ANTHRACENE (so_ss)													
General Statistics													
Number of Valid Data				40		Number of Detected Data				6			
Number of Distinct Detected Data				6		Number of Non-Detect Data				34			
Tolerance Factor				1.69		Percent Non-Detects				85.00%			
Number of Missing Values				75									
Raw Statistics						Log-transformed Statistics							
Minimum Detected				52		Minimum Detected				3.951			
Maximum Detected				79		Maximum Detected				4.369			
Mean of Detected				60.5		Mean of Detected				4.091			
SD of Detected				10.45		SD of Detected				0.162			
Minimum Non-Detect				170		Minimum Non-Detect				5.136			
Maximum Non-Detect				310		Maximum Non-Detect				5.737			
Data with Multiple Detection Limits						Single Detection Limit Scenario							
Note: Data have multiple DLs - Use of KM Method is recommen						Number treated as Non-Detect with Single DL				40			
For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL				0			
Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage				100.00%			
Warning: There are only 6 Detected Values in this data													
Note: It should be noted that even though bootstrap may be performed on this data set													
the resulting calculations may not be reliable enough to draw conclusions													
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.													
Background Statistics													
Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only							
Shapiro Wilk Test Statistic				0.843		Shapiro Wilk Test Statistic				0.867			
5% Shapiro Wilk Critical Value				0.788		5% Shapiro Wilk Critical Value				0.788			
Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level							
Assuming Normal Distribution						Assuming Lognormal Distribution							
DL/2 Substitution Method						DL/2 Substitution Method							
Mean				114		Mean (Log Scale)				4.704			
SD				24.97		SD (Log Scale)				0.279			
95% UTL 90% Coverage				156.1		95% UTL 90% Coverage				176.9			
95% UPL (t)				156.5		95% UPL (t)				177.7			
90% Percentile (z)				145.9		90% Percentile (z)				157.8			
95% Percentile (z)				155		95% Percentile (z)				174.7			
99% Percentile (z)				172		99% Percentile (z)				211.3			
Maximum Likelihood Estimate(MLE) Method						N/A		Log ROS Method					
								Mean in Original Scale				60.36	
								SD in Original Scale				8.373	
								Mean in Log Scale				4.091	
								SD in Log Scale				0.137	

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

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Table 2
ProUCL Output

				Median	64.97					95% Percentile (z)	83.96	
				SD	9.416					99% Percentile (z)	92.42	
				k star	44.85							
				Theta star	1.43					Gamma ROS Limits with Extrapolated Data		
				Nu star	3588					95% Wilson Hilferty (WH) Approx. Gamma UPL	80.9	
				95% Percentile of Chisquare (2k)	112.8					95% Hawkins Wixley (HW) Approx. Gamma UPL	81.01	
										95% WH Approx. Gamma UTL with 90% Coverage	80.72	
				90% Percentile	76.68					95% HW Approx. Gamma UTL with 90% Coverage	80.83	
				95% Percentile	80.67							
				99% Percentile	88.5							
				Note: DL/2 is not a recommended method.								
				OS UG/KG BENZO(B)FLUORANTHENE (br_na)								
				General Statistics								
				Total Number of Observations	0					Number of Distinct Observations	0	
				Tolerance Factor	N/A					Number of Missing Values	30	
				Warning: This data set only has 0 observations!								
				Data set is too small to compute reliable and meaningful statistics and estimates!								
				The data set for variable OS UG/KG BENZO(B)FLUORANTHENE (br_na) was not processed!								
				It is suggested to collect at least 8 to 10 observations before using these statistical methods!								
				If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.								
				OS UG/KG BENZO(B)FLUORANTHENE (so_sb)								
				General Statistics								
				Total Number of Observations	0					Number of Distinct Observations	0	
				Tolerance Factor	N/A					Number of Missing Values	100	
				Warning: This data set only has 0 observations!								
				Data set is too small to compute reliable and meaningful statistics and estimates!								
				The data set for variable OS UG/KG BENZO(B)FLUORANTHENE (so_sb) was not processed!								
				It is suggested to collect at least 8 to 10 observations before using these statistical methods!								
				If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.								
				OS UG/KG BENZO(B)FLUORANTHENE (so_ss)								
				General Statistics								
				Number of Valid Data	40					Number of Detected Data	13	
				Number of Distinct Detected Data	12					Number of Non-Detect Data	27	
				Tolerance Factor	1.69					Percent Non-Detects	67.50%	
				Number of Missing Values	75							
				Raw Statistics				Log-transformed Statistics				
				Minimum Detected	51			Minimum Detected	3.932			
				Maximum Detected	130			Maximum Detected	4.868			
				Mean of Detected	78.69			Mean of Detected	4.323			
				SD of Detected	25.25			SD of Detected	0.295			
				Minimum Non-Detect	170			Minimum Non-Detect	5.136			
				Maximum Non-Detect	310			Maximum Non-Detect	5.737			
				Data with Multiple Detection Limits				Single Detection Limit Scenario				
				Note: Data have multiple DLs - Use of KM Method is recommen				Number treated as Non-Detect with Single DL				

Table 2
ProUCL Output

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Table 2
ProUCL Output

Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable OS UG/KG BENZO(G,H,I) PERYLENE (br_na) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG BENZO(G,H,I) PERYLENE (so_sb)													
General Statistics													
Total Number of Observations				0	Number of Distinct Observations				0				
Tolerance Factor				N/A	Number of Missing Values				100				
Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable OS UG/KG BENZO(G,H,I) PERYLENE (so_sb) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG BENZO(G,H,I) PERYLENE (so_ss)													
General Statistics													
Number of Valid Data				40	Number of Detected Data				5				
Number of Distinct Detected Data				5	Number of Non-Detect Data				35				
Tolerance Factor				1.69	Percent Non-Detects				87.50%				
Number of Missing Values				75									
Raw Statistics						Log-transformed Statistics							
Minimum Detected				55	Minimum Detected				4.007				
Maximum Detected				100	Maximum Detected				4.605				
Mean of Detected				68.4	Mean of Detected				4.199				
SD of Detected				18.9	SD of Detected				0.251				
Minimum Non-Detect				170	Minimum Non-Detect				5.136				
Maximum Non-Detect				310	Maximum Non-Detect				5.737				
Data with Multiple Detection Limits						Single Detection Limit Scenario							
Note: Data have multiple DLs - Use of KM Method is recommen						Number treated as Non-Detect with Single DL		40					
For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL		0					
Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage		100.00%					
Warning: There are only 5 Detected Values in this data													
Note: It should be noted that even though bootstrap may be performed on this data set													
the resulting calculations may not be reliable enough to draw conclusions													
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.													
Background Statistics													
Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only							
Shapiro Wilk Test Statistic				0.786	Shapiro Wilk Test Statistic				0.819				
5% Shapiro Wilk Critical Value				0.762	5% Shapiro Wilk Critical Value				0.762				
Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level							
Assuming Normal Distribution						Assuming Lognormal Distribution							
DL/2 Substitution Method					DL/2 Substitution Method								
Mean				117.3	Mean (Log Scale)				4.741				
SD				22.05	SD (Log Scale)				0.238				

Table 2
ProUCL Output

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Table 2
ProUCL Output

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Table 2
ProUCL Output

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Table 2
ProUCL Output

OS UG/KG BIS(2-CHLOROETHOXY)METHANE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG BIS(2-CHLOROETHOXY)METHANE (so_ss) was not processed!			
OS UG/KG BIS(2-CHLOROETHYL)ETHER (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG BIS(2-CHLOROETHYL)ETHER (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG BIS(2-CHLOROETHYL)ETHER (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG BIS(2-CHLOROETHYL)ETHER (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG BIS(2-CHLOROETHYL)ETHER (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG BIS(2-CHLOROETHYL)ETHER (so_ss) was not processed!			
OS UG/KG BIS(2-ETHYLHEXYL)PHTHALATE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0

Table 2
ProUCL Output

	Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!				
Data set is too small to compute reliable and meaningful statistics and estimates!				
The data set for variable OS UG/KG BIS(2-ETHYLHEXYL)PHTHALATE (br_na) was not processed!				
It is suggested to collect at least 8 to 10 observations before using these statistical methods!				
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
OS UG/KG BIS(2-ETHYLHEXYL)PHTHALATE (so_sb)				
General Statistics				
Total Number of Observations	0	Number of Distinct Observations	0	
Tolerance Factor	N/A	Number of Missing Values	100	
Warning: This data set only has 0 observations!				
Data set is too small to compute reliable and meaningful statistics and estimates!				
The data set for variable OS UG/KG BIS(2-ETHYLHEXYL)PHTHALATE (so_sb) was not processed!				
It is suggested to collect at least 8 to 10 observations before using these statistical methods!				
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
OS UG/KG BIS(2-ETHYLHEXYL)PHTHALATE (so_ss)				
General Statistics				
Number of Valid Data	40	Number of Detected Data	2	
Number of Distinct Detected Data	2	Number of Non-Detect Data	38	
Warning: Data set has only 2 Detected Values.				
This is not enough to compute meaningful and reliable test statistics and estimates.				
No statistics will be produced!				
Tolerance Factor	1.69	Percent Non-Detects	95.00%	
Number of Missing Values	75			
Raw Statistics		Log-transformed Statistics		
Minimum Detected	130	Minimum Detected	4.868	
Maximum Detected	160	Maximum Detected	5.075	
Mean of Detected	145	Mean of Detected	4.971	
SD of Detected	21.21	SD of Detected	0.147	
Minimum Non-Detect	230	Minimum Non-Detect	5.438	
Maximum Non-Detect	310	Maximum Non-Detect	5.737	
Data with Multiple Detection Limits		Single Detection Limit Scenario		
Note: Data have multiple DLs - Use of KM Method is recommen		Number treated as Non-Detect with Single DL	40	
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected with Single DL	0	
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%	
Warning: Data set has only 2 Distinct Detected Values.				
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.				
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).				
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.				
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.				
Those methods will return a 'N/A' value on your output display!				
It is necessary to have 4 or more Distinct Values for bootstrap methods.				

Table 2
ProUCL Output

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Table 2
ProUCL Output

Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG BUTYL BENZYL PHTHALATE (br_na) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG BUTYL BENZYL PHTHALATE (so_sb)											
General Statistics											
Total Number of Observations					0	Number of Distinct Observations					0
Tolerance Factor					N/A	Number of Missing Values					100
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG BUTYL BENZYL PHTHALATE (so_sb) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG BUTYL BENZYL PHTHALATE (so_ss)											
General Statistics											
Number of Valid Data					40	Number of Detected Data					0
Number of Distinct Detected Data					0	Number of Non-Detect Data					40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).											
The data set for variable OS UG/KG BUTYL BENZYL PHTHALATE (so_ss) was not processed!											
OS UG/KG CAPROLACTAM (br_na)											
General Statistics											
Total Number of Observations					0	Number of Distinct Observations					0
Tolerance Factor					N/A	Number of Missing Values					30
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG CAPROLACTAM (br_na) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG CAPROLACTAM (so_sb)											
General Statistics											
Total Number of Observations					0	Number of Distinct Observations					0
Tolerance Factor					N/A	Number of Missing Values					100
Warning: This data set only has 0 observations!											

Table 2
ProUCL Output

Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG CAPROLACTAM (so_sb) was not processed!				
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
OS UG/KG CAPROLACTAM (so_ss)				
General Statistics				
Number of Valid Data		40	Number of Detected Data	0
Number of Distinct Detected Data		0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).				
The data set for variable OS UG/KG CAPROLACTAM (so_ss) was not processed!				
OS UG/KG CARBAZOLE (br_na)				
General Statistics				
Total Number of Observations		0	Number of Distinct Observations	0
Tolerance Factor		N/A	Number of Missing Values	30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG CARBAZOLE (br_na) was not processed!				
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
OS UG/KG CARBAZOLE (so_sb)				
General Statistics				
Total Number of Observations		0	Number of Distinct Observations	0
Tolerance Factor		N/A	Number of Missing Values	100
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG CARBAZOLE (so_sb) was not processed!				
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
OS UG/KG CARBAZOLE (so_ss)				
General Statistics				
Number of Valid Data		40	Number of Detected Data	0
Number of Distinct Detected Data		0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).				

Table 2
ProUCL Output

The data set for variable OS UG/KG CARBAZOLE (so_ss) was not processed!												
OS UG/KG CHRYSENE (br_na)												
General Statistics												
Total Number of Observations				0		Number of Distinct Observations				0		
Tolerance Factor				N/A		Number of Missing Values				30		
Warning: This data set only has 0 observations!												
Data set is too small to compute reliable and meaningful statistics and estimates!												
The data set for variable OS UG/KG CHRYSENE (br_na) was not processed!												
It is suggested to collect at least 8 to 10 observations before using these statistical methods!												
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.												
OS UG/KG CHRYSENE (so_sb)												
General Statistics												
Total Number of Observations				0		Number of Distinct Observations				0		
Tolerance Factor				N/A		Number of Missing Values				100		
Warning: This data set only has 0 observations!												
Data set is too small to compute reliable and meaningful statistics and estimates!												
The data set for variable OS UG/KG CHRYSENE (so_sb) was not processed!												
It is suggested to collect at least 8 to 10 observations before using these statistical methods!												
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.												
OS UG/KG CHRYSENE (so_ss)												
General Statistics												
Number of Valid Data				40		Number of Detected Data				13		
Number of Distinct Detected Data				11		Number of Non-Detect Data				27		
Tolerance Factor				1.69		Percent Non-Detects				67.50%		
Number of Missing Values				75								
Raw Statistics						Log-transformed Statistics						
Minimum Detected				54		Minimum Detected				3.989		
Maximum Detected				140		Maximum Detected				4.942		
Mean of Detected				74.92		Mean of Detected				4.286		
SD of Detected				21.92		SD of Detected				0.243		
Minimum Non-Detect				170		Minimum Non-Detect				5.136		
Maximum Non-Detect				310		Maximum Non-Detect				5.737		
Data with Multiple Detection Limits						Single Detection Limit Scenario						
Note: Data have multiple DLs - Use of KM Method is recommen						Number treated as Non-Detect with Single DL				40		
For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL				0		
Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage				100.00%		
Background Statistics												
Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only						
Shapiro Wilk Test Statistic				0.741		Shapiro Wilk Test Statistic				0.861		
5% Shapiro Wilk Critical Value				0.866		5% Shapiro Wilk Critical Value				0.866		
Data not Normal at 5% Significance Level						Data not Lognormal at 5% Significance Level						
Assuming Normal Distribution						Assuming Lognormal Distribution						

Table 2
ProUCL Output

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Table 2
ProUCL Output

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Table 2
ProUCL Output

General Statistics													
Number of Valid Data						40	Number of Detected Data						0
Number of Distinct Detected Data						0	Number of Non-Detect Data						40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).													
The data set for variable OS UG/KG DIBENZOFURAN (so_ss) was not processed!													
OS UG/KG DIETHYL PHTHALATE (br_na)													
General Statistics													
Total Number of Observations						0	Number of Distinct Observations						0
Tolerance Factor						N/A	Number of Missing Values						30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG DIETHYL PHTHALATE (br_na) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG DIETHYL PHTHALATE (so_sb)													
General Statistics													
Total Number of Observations						0	Number of Distinct Observations						0
Tolerance Factor						N/A	Number of Missing Values						100
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG DIETHYL PHTHALATE (so_sb) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
OS UG/KG DIETHYL PHTHALATE (so_ss)													
General Statistics													
Number of Valid Data						40	Number of Detected Data						0
Number of Distinct Detected Data						0	Number of Non-Detect Data						40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).													
The data set for variable OS UG/KG DIETHYL PHTHALATE (so_ss) was not processed!													
OS UG/KG DIMETHYL PHTHALATE (br_na)													
General Statistics													
Total Number of Observations						0	Number of Distinct Observations						0
Tolerance Factor						N/A	Number of Missing Values						30

Table 2
ProUCL Output

Warning: This data set only has 0 observations!										
Data set is too small to compute reliable and meaningful statistics and estimates!										
The data set for variable OS UG/KG DIMETHYL PHTHALATE (br_na) was not processed!										
It is suggested to collect at least 8 to 10 observations before using these statistical methods!										
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.										
OS UG/KG DIMETHYL PHTHALATE (so_sb)										
General Statistics										
Total Number of Observations					0	Number of Distinct Observations				0
Tolerance Factor					N/A	Number of Missing Values				100
Warning: This data set only has 0 observations!										
Data set is too small to compute reliable and meaningful statistics and estimates!										
The data set for variable OS UG/KG DIMETHYL PHTHALATE (so_sb) was not processed!										
It is suggested to collect at least 8 to 10 observations before using these statistical methods!										
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.										
OS UG/KG DIMETHYL PHTHALATE (so_ss)										
General Statistics										
Number of Valid Data					40	Number of Detected Data				0
Number of Distinct Detected Data					0	Number of Non-Detect Data				40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
The data set for variable OS UG/KG DIMETHYL PHTHALATE (so_ss) was not processed!										
OS UG/KG DI-N-BUTYL PHTHALATE (br_na)										
General Statistics										
Total Number of Observations					0	Number of Distinct Observations				0
Tolerance Factor					N/A	Number of Missing Values				30
Warning: This data set only has 0 observations!										
Data set is too small to compute reliable and meaningful statistics and estimates!										
The data set for variable OS UG/KG DI-N-BUTYL PHTHALATE (br_na) was not processed!										
It is suggested to collect at least 8 to 10 observations before using these statistical methods!										
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.										
OS UG/KG DI-N-BUTYL PHTHALATE (so_sb)										
General Statistics										
Total Number of Observations					0	Number of Distinct Observations				0
Tolerance Factor					N/A	Number of Missing Values				100
Warning: This data set only has 0 observations!										

Table 2
ProUCL Output

Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG DI-N-BUTYL PHTHALATE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG DI-N-BUTYL PHTHALATE (so_ss)			
General Statistics			
Number of Valid Data		40	Number of Detected Data
Number of Distinct Detected Data		0	Number of Non-Detect Data
			40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG DI-N-BUTYL PHTHALATE (so_ss) was not processed!			
OS UG/KG DI-N-OCTYL PHTHALATE (br_na)			
General Statistics			
Total Number of Observations		0	Number of Distinct Observations
Tolerance Factor		N/A	Number of Missing Values
			30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG DI-N-OCTYL PHTHALATE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG DI-N-OCTYL PHTHALATE (so_sb)			
General Statistics			
Total Number of Observations		0	Number of Distinct Observations
Tolerance Factor		N/A	Number of Missing Values
			100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG DI-N-OCTYL PHTHALATE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG DI-N-OCTYL PHTHALATE (so_ss)			
General Statistics			
Number of Valid Data		40	Number of Detected Data
Number of Distinct Detected Data		0	Number of Non-Detect Data
			40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			

Table 2
ProUCL Output

The data set for variable OS UG/KG DI-N-OCTYL PHTHALATE (so_ss) was not processed!											
OS UG/KG FLUORANTHENE (br_na)											
General Statistics											
Total Number of Observations				0	Number of Distinct Observations				0		
Tolerance Factor				N/A	Number of Missing Values				30		
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG FLUORANTHENE (br_na) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG FLUORANTHENE (so_sb)											
General Statistics											
Total Number of Observations				0	Number of Distinct Observations				0		
Tolerance Factor				N/A	Number of Missing Values				100		
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG FLUORANTHENE (so_sb) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG FLUORANTHENE (so_ss)											
General Statistics											
Number of Valid Data				40	Number of Detected Data				31		
Number of Distinct Detected Data				24	Number of Non-Detect Data				9		
Tolerance Factor				1.69	Percent Non-Detects				22.50%		
Number of Missing Values				75							
Raw Statistics					Log-transformed Statistics						
Minimum Detected				56	Minimum Detected				4.025		
Maximum Detected				230	Maximum Detected				5.438		
Mean of Detected				94.24	Mean of Detected				4.482		
SD of Detected				38.11	SD of Detected				0.349		
Minimum Non-Detect				170	Minimum Non-Detect				5.136		
Maximum Non-Detect				260	Maximum Non-Detect				5.561		
Data with Multiple Detection Limits					Single Detection Limit Scenario						
Note: Data have multiple DLs - Use of KM Method is recommen					Number treated as Non-Detect with Single DL				40		
For all methods (except KM, DL/2, and ROS Methods),					Number treated as Detected with Single DL				0		
Observations < Largest ND are treated as NDs					Single DL Non-Detect Percentage				100.00%		
Background Statistics											
Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only						
Shapiro Wilk Test Statistic				0.833	Shapiro Wilk Test Statistic				0.931		
5% Shapiro Wilk Critical Value				0.929	5% Shapiro Wilk Critical Value				0.929		
Data not Normal at 5% Significance Level					Data appear Lognormal at 5% Significance Level						
Assuming Normal Distribution					Assuming Lognormal Distribution						

Table 2
ProUCL Output

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Table 2
ProUCL Output

OS UG/KG FLUORENE (so_sb)			
General Statistics			
Total Number of Observations		0	Number of Distinct Observations
Tolerance Factor		N/A	Number of Missing Values
			0
			100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG FLUORENE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG FLUORENE (so_ss)			
General Statistics			
Number of Valid Data		40	Number of Detected Data
Number of Distinct Detected Data		0	Number of Non-Detect Data
			40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG FLUORENE (so_ss) was not processed!			
OS UG/KG HEXACHLOROBENZENE (br_na)			
General Statistics			
Total Number of Observations		0	Number of Distinct Observations
Tolerance Factor		N/A	Number of Missing Values
			30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG HEXACHLOROBENZENE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG HEXACHLOROBENZENE (so_sb)			
General Statistics			
Total Number of Observations		0	Number of Distinct Observations
Tolerance Factor		N/A	Number of Missing Values
			100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
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OS UG/KG HEXACHLOROBENZENE (so_ss)			

Table 2
ProUCL Output

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Table 2
ProUCL Output

Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG HEXACHLOROETHANE (br_na) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG HEXACHLOROETHANE (so_sb)											
General Statistics											
Total Number of Observations					0	Number of Distinct Observations					0
Tolerance Factor					N/A	Number of Missing Values					100
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG HEXACHLOROETHANE (so_sb) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG HEXACHLOROETHANE (so_ss)											
General Statistics											
Number of Valid Data					40	Number of Detected Data					0
Number of Distinct Detected Data					0	Number of Non-Detect Data					40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV),											
The data set for variable OS UG/KG HEXACHLOROETHANE (so_ss) was not processed!											
OS UG/KG HIGH MOLECULAR WEIGHT PAHS (br_na)											
General Statistics											
Total Number of Observations					0	Number of Distinct Observations					0
Tolerance Factor					N/A	Number of Missing Values					30
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG HIGH MOLECULAR WEIGHT PAHS (br_na) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG HIGH MOLECULAR WEIGHT PAHS (so_sb)											
General Statistics											
Total Number of Observations					0	Number of Distinct Observations					0
Tolerance Factor					N/A	Number of Missing Values					100
Warning: This data set only has 0 observations!											

Table 2
ProUCL Output

Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG HIGH MOLECULAR WEIGHT PAHS (so_sb) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG HIGH MOLECULAR WEIGHT PAHS (so_ss)											
General Statistics											
Number of Valid Data				40	Number of Detected Data				34		
Number of Distinct Detected Data				31	Number of Non-Detect Data				6		
Tolerance Factor				1.69	Percent Non-Detects				15.00%		
Number of Missing Values				75							
Raw Statistics						Log-transformed Statistics					
Minimum Detected				44	Minimum Detected				3.784		
Maximum Detected				1172	Maximum Detected				7.066		
Mean of Detected				290.4	Mean of Detected				5.364		
SD of Detected				250.4	SD of Detected				0.791		
Minimum Non-Detect				230	Minimum Non-Detect				5.438		
Maximum Non-Detect				260	Maximum Non-Detect				5.561		
Data with Multiple Detection Limits						Single Detection Limit Scenario					
Note: Data have multiple DLs - Use of KM Method is recommen						Number treated as Non-Detect with Single DL				26	
For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL				14	
Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage				65.00%	
Background Statistics											
Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only					
Shapiro Wilk Test Statistic				0.799	Shapiro Wilk Test Statistic				0.958		
5% Shapiro Wilk Critical Value				0.933	5% Shapiro Wilk Critical Value				0.933		
Data not Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level					
Assuming Normal Distribution						Assuming Lognormal Distribution					
DL/2 Substitution Method					DL/2 Substitution Method						
Mean				265.1	Mean (Log Scale)				5.279		
SD				238.3	SD (Log Scale)				0.756		
95% UTL 90% Coverage				667.8	95% UTL 90% Coverage				704.4		
95% UPL (t)				671.6	95% UPL (t)				713		
90% Percentile (z)				570.5	90% Percentile (z)				517.3		
95% Percentile (z)				657.1	95% Percentile (z)				680.9		
99% Percentile (z)				819.5	99% Percentile (z)				1140		
Maximum Likelihood Estimate(MLE) Method						Log ROS Method					
Mean				94.96	Mean in Original Scale				267.5		
SD				407.9	SD in Original Scale				237.3		
95% UTL with 90% Coverage				784.3	95% UTL with 90% Coverage				712.6		
						95% BCA UTL with 90% Coverage					
						95% Bootstrap (%) UTL with 90% Coverage					
95% UPL (t)				790.8	95% UPL (t)				721.2		
90% Percentile (z)				617.8	90% Percentile (z)				523.6		
95% Percentile (z)				766	95% Percentile (z)				688.8		
99% Percentile (z)				1044	99% Percentile (z)				1152		
Gamma Distribution Test with Detected Values Only						Data Distribution Test with Detected Values Only					
k star (bias corrected)				1.639	Data appear Lognormal at 5% Significance Level						
Theta Star				177.2							
nu star				111.4							
A-D Test Statistic						Nonparametric Statistics					
5% A-D Critical Value				0.762	Kaplan-Meier (KM) Method						
K-S Test Statistic				0.188	Mean				266.4		

Table 2
ProUCL Output

				5% K-S Critical Value	0.153					SD	235.1	
				Data not Gamma Distributed at 5% Significance Level						SE of Mean	37.84	
										95% KM UTL with 90% Coverage	663.6	
				Assuming Gamma Distribution						95% KM Chebyshev UPL	1304	
				Gamma ROS Statistics with Extrapolated Data						95% KM UPL (t)	667.4	
				Mean	272.1					90% Percentile (z)	567.6	
				Median	171					95% Percentile (z)	653	
				SD	236.9					99% Percentile (z)	813.2	
				k star	1.669							
				Theta star	163					Gamma ROS Limits with Extrapolated Data		
				Nu star	133.5					95% Wilson Hilferty (WH) Approx. Gamma UPL	689.7	
				95% Percentile of Chisquare (2k)	8.392					95% Hawkins Wixley (HW) Approx. Gamma UPL	701.7	
										95% WH Approx. Gamma UTL with 90% Coverage	683.6	
				90% Percentile	552.5					95% HW Approx. Gamma UTL with 90% Coverage	695	
				95% Percentile	684.1							
				99% Percentile	979.4							
				Note: DL/2 is not a recommended method.								
				OS UG/KG INDENO(1,2,3-CD)PYRENE (br_na)								
				General Statistics								
				Total Number of Observations	0					Number of Distinct Observations	0	
				Tolerance Factor	N/A					Number of Missing Values	30	
				Warning: This data set only has 0 observations!								
				Data set is too small to compute reliable and meaningful statistics and estimates!								
				The data set for variable OS UG/KG INDENO(1,2,3-CD)PYRENE (br_na) was not processed!								
				It is suggested to collect at least 8 to 10 observations before using these statistical methods!								
				If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.								
				OS UG/KG INDENO(1,2,3-CD)PYRENE (so_sb)								
				General Statistics								
				Total Number of Observations	0					Number of Distinct Observations	0	
				Tolerance Factor	N/A					Number of Missing Values	100	
				Warning: This data set only has 0 observations!								
				Data set is too small to compute reliable and meaningful statistics and estimates!								
				The data set for variable OS UG/KG INDENO(1,2,3-CD)PYRENE (so_sb) was not processed!								
				It is suggested to collect at least 8 to 10 observations before using these statistical methods!								
				If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.								
				OS UG/KG INDENO(1,2,3-CD)PYRENE (so_ss)								
				General Statistics								
				Number of Valid Data	40					Number of Detected Data	2	
				Number of Distinct Detected Data	2					Number of Non-Detect Data	38	
				Warning: Data set has only 2 Detected Values.								
				This is not enough to compute meaningful and reliable test statistics and estimates.								
				No statistics will be produced!								
				Tolerance Factor	1.69					Percent Non-Detects	95.00%	
				Number of Missing Values	75							

Table 2
ProUCL Output

	Raw Statistics					Log-transformed Statistics						
	Minimum Detected		60			Minimum Detected		4.094				
	Maximum Detected		98			Maximum Detected		4.585				
	Mean of Detected		79			Mean of Detected		4.34				
	SD of Detected		26.87			SD of Detected		0.347				
	Minimum Non-Detect		170			Minimum Non-Detect		5.136				
	Maximum Non-Detect		310			Maximum Non-Detect		5.737				
	Data with Multiple Detection Limits					Single Detection Limit Scenario						
	Note: Data have multiple DLs - Use of KM Method is recommended					Number treated as Non-Detect with Single DL		40				
	For all methods (except KM, DL/2, and ROS Methods),					Number treated as Detected with Single DL		0				
	Observations < Largest ND are treated as NDs					Single DL Non-Detect Percentage		100.00%				
	Warning: Data set has only 2 Distinct Detected Values.											
	This may not be adequate enough to compute meaningful and reliable test statistics and estimates.											
	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
	Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.											
	The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.											
	Those methods will return a 'N/A' value on your output display!											
	It is necessary to have 4 or more Distinct Values for bootstrap methods.											
	However, results obtained using 4 to 9 distinct values may not be reliable.											
	It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.											
	Background Statistics											
	Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only						
	Shapiro Wilk Test Statistic		N/A			Shapiro Wilk Test Statistic		N/A				
	5% Shapiro Wilk Critical Value		N/A			5% Shapiro Wilk Critical Value		N/A				
	Data not Normal at 5% Significance Level					Data not Lognormal at 5% Significance Level						
	Assuming Normal Distribution					Assuming Lognormal Distribution						
	DL/2 Substitution Method					DL/2 Substitution Method						
	Mean		122			Mean (Log Scale)		4.794				
	SD		14.8			SD (Log Scale)		0.147				
	95% UTL 90% Coverage		147			95% UTL 90% Coverage		154.9				
	95% UPL (t)		147.2			95% UPL (t)		155.2				
	90% Percentile (z)		140.9			90% Percentile (z)		145.9				
	95% Percentile (z)		146.3			95% Percentile (z)		153.9				
	99% Percentile (z)		156.4			99% Percentile (z)		170				
	Maximum Likelihood Estimate(MLE) Method		N/A			Log ROS Method						
						Mean in Original Scale		N/A				
						SD in Original Scale		N/A				
						Mean in Log Scale		N/A				
						SD in Log Scale		N/A				
						95% UTL 90% Coverage		N/A				
						95% UPL (t)		N/A				
						90% Percentile (z)		N/A				
						95% Percentile (z)		N/A				
						99% Percentile (z)		N/A				
	Gamma Distribution Test with Detected Values Only					Data Distribution Test with Detected Values Only						
	k star (bias corrected)		N/A			Data do not follow a Discernable Distribution (0.05)						
	Theta Star		N/A									
	nu star		N/A									
	A-D Test Statistic		N/A			Nonparametric Statistics						
	5% A-D Critical Value		N/A			Kaplan-Meier (KM) Method						
	K-S Test Statistic		N/A			Mean		79				
	5% K-S Critical Value		N/A			SD		19				
	Data not Gamma Distributed at 5% Significance Level					SE of Mean		19				

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

OS UG/KG LOW MOLECULAR WEIGHT PAHS (br_na)											
General Statistics											
Total Number of Observations				0		Number of Distinct Observations				0	
Tolerance Factor				N/A		Number of Missing Values				30	
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG LOW MOLECULAR WEIGHT PAHS (br_na) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG LOW MOLECULAR WEIGHT PAHS (so_sb)											
General Statistics											
Total Number of Observations				0		Number of Distinct Observations				0	
Tolerance Factor				N/A		Number of Missing Values				100	
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable OS UG/KG LOW MOLECULAR WEIGHT PAHS (so_sb) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
OS UG/KG LOW MOLECULAR WEIGHT PAHS (so_ss)											
General Statistics											
Number of Valid Data				40		Number of Detected Data				17	
Number of Distinct Detected Data				15		Number of Non-Detect Data				23	
Tolerance Factor				1.69		Percent Non-Detects				57.50%	
Number of Missing Values				75							
Raw Statistics						Log-transformed Statistics					
Minimum Detected				51		Minimum Detected				3.932	
Maximum Detected				95		Maximum Detected				4.554	
Mean of Detected				67.24		Mean of Detected				4.19	
SD of Detected				13.78		SD of Detected				0.192	
Minimum Non-Detect				170		Minimum Non-Detect				5.136	
Maximum Non-Detect				310		Maximum Non-Detect				5.737	
Data with Multiple Detection Limits						Single Detection Limit Scenario					
Note: Data have multiple DLs - Use of KM Method is recommen						Number treated as Non-Detect with Single DL				40	
For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL				0	
Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage				100.00%	
Background Statistics											
Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only					
Shapiro Wilk Test Statistic				0.866		Shapiro Wilk Test Statistic				0.907	
5% Shapiro Wilk Critical Value				0.892		5% Shapiro Wilk Critical Value				0.892	
Data not Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level					
Assuming Normal Distribution						Assuming Lognormal Distribution					
DL/2 Substitution Method						DL/2 Substitution Method					
Mean				99.64		Mean (Log Scale)				4.548	
SD				30.96		SD (Log Scale)				0.344	
95% UTL 90% Coverage				152		95% UTL 90% Coverage				168.9	

Table 2
ProUCL Output

				95% UPL (t)	152.5					95% UPL (t)	169.8	
				90% Percentile (z)	139.3					90% Percentile (z)	146.7	
				95% Percentile (z)	150.6					95% Percentile (z)	166.3	
				99% Percentile (z)	171.7					99% Percentile (z)	210.2	
				Maximum Likelihood Estimate(MLE) Method	N/A					Log ROS Method		
										Mean in Original Scale	66.85	
										SD in Original Scale	10.98	
										Mean in Log Scale	4.19	
										SD in Log Scale	0.157	
										95% UTL 90% Coverage	86.14	
										95% UPL (t)	86.36	
										90% Percentile (z)	80.78	
										95% Percentile (z)	85.54	
										99% Percentile (z)	95.22	
				Gamma Distribution Test with Detected Values Only						Data Distribution Test with Detected Values Only		
				k star (bias corrected)	22.86					Data appear Gamma Distributed at 5% Significance Level		
				Theta Star	2.941							
				nu star	777.2							
				A-D Test Statistic	0.711					Nonparametric Statistics		
				5% A-D Critical Value	0.738					Kaplan-Meier (KM) Method		
				K-S Test Statistic	0.161					Mean	67.24	
				5% K-S Critical Value	0.209					SD	13.37	
				Data appear Gamma Distributed at 5% Significance Level						SE of Mean	3.343	
										95% KM UTL with 90% Coverage	89.83	
				Assuming Gamma Distribution						95% KM Chebyshev UPL	126.2	
				Gamma ROS Statistics with Extrapolated Data						95% KM UPL (t)	90.04	
				Mean	67.98					90% Percentile (z)	84.37	
				Median	69.95					95% Percentile (z)	89.23	
				SD	10.7					99% Percentile (z)	98.34	
				k star	39.45							
				Theta star	1.723					Gamma ROS Limits with Extrapolated Data		
				Nu star	3156					95% Wilson Hilferty (WH) Approx. Gamma UPL	86.97	
				95% Percentile of Chisquare (2k)	100.6					95% Hawkins Wixley (HW) Approx. Gamma UPL	87.09	
										95% WH Approx. Gamma UTL with 90% Coverage	86.77	
				90% Percentile	82.16					95% HW Approx. Gamma UTL with 90% Coverage	86.88	
				95% Percentile	86.7							
				99% Percentile	95.66							
				Note: DL/2 is not a recommended method.								
				OS UG/KG NAPHTHALENE (br_na)								
				General Statistics								
				Total Number of Observations	0					Number of Distinct Observations	0	
				Tolerance Factor	N/A					Number of Missing Values	30	
				Warning: This data set only has 0 observations!								
				Data set is too small to compute reliable and meaningful statistics and estimates!								
				The data set for variable OS UG/KG NAPHTHALENE (br_na) was not processed!								
				It is suggested to collect at least 8 to 10 observations before using these statistical methods!								
				If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.								
				OS UG/KG NAPHTHALENE (so_sb)								
				General Statistics								
				Total Number of Observations	0					Number of Distinct Observations	0	

Table 2
ProUCL Output

				Tolerance Factor	N/A			Number of Missing Values	100
Warning: This data set only has 0 observations!									
Data set is too small to compute reliable and meaningful statistics and estimates!									
The data set for variable OS UG/KG NAPHTHALENE (so_sb) was not processed!									
It is suggested to collect at least 8 to 10 observations before using these statistical methods!									
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.									
OS UG/KG NAPHTHALENE (so_ss)									
General Statistics									
Number of Valid Data						40	Number of Detected Data		0
Number of Distinct Detected Data						0	Number of Non-Detect Data		40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!									
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!									
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).									
The data set for variable OS UG/KG NAPHTHALENE (so_ss) was not processed!									
OS UG/KG NITROBENZENE (br_na)									
General Statistics									
Total Number of Observations						0	Number of Distinct Observations		0
Tolerance Factor						N/A	Number of Missing Values		30
Warning: This data set only has 0 observations!									
Data set is too small to compute reliable and meaningful statistics and estimates!									
The data set for variable OS UG/KG NITROBENZENE (br_na) was not processed!									
It is suggested to collect at least 8 to 10 observations before using these statistical methods!									
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.									
OS UG/KG NITROBENZENE (so_sb)									
General Statistics									
Total Number of Observations						0	Number of Distinct Observations		0
Tolerance Factor						N/A	Number of Missing Values		100
Warning: This data set only has 0 observations!									
Data set is too small to compute reliable and meaningful statistics and estimates!									
The data set for variable OS UG/KG NITROBENZENE (so_sb) was not processed!									
It is suggested to collect at least 8 to 10 observations before using these statistical methods!									
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.									
OS UG/KG NITROBENZENE (so_ss)									
General Statistics									
Number of Valid Data						40	Number of Detected Data		0
Number of Distinct Detected Data						0	Number of Non-Detect Data		40

Table 2
ProUCL Output

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG NITROBENZENE (so_ss) was not processed!			
OS UG/KG N-NITROSO-DI-N-PROPYLAMINE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG N-NITROSO-DI-N-PROPYLAMINE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG N-NITROSO-DI-N-PROPYLAMINE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG N-NITROSO-DI-N-PROPYLAMINE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG N-NITROSO-DI-N-PROPYLAMINE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	39
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! The Project Team may decide to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG N-NITROSO-DI-N-PROPYLAMINE (so_ss) was not processed!			
OS UG/KG N-NITROSODIPHENYLAMINE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable OS UG/KG N-NITROSODIPHENYLAMINE (br_na) was not processed!			

Table 2
ProUCL Output

It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG N-NITROSODIPHENYLAMINE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG N-NITROSODIPHENYLAMINE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG N-NITROSODIPHENYLAMINE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OS UG/KG N-NITROSODIPHENYLAMINE (so_ss) was not processed!			
OS UG/KG PENTACHLOROPHENOL (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG PENTACHLOROPHENOL (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OS UG/KG PENTACHLOROPHENOL (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OS UG/KG PENTACHLOROPHENOL (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			

Table 2
ProUCL Output

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Table 2
ProUCL Output

Warning: This data set only has 0 observations!									
Data set is too small to compute reliable and meaningful statistics and estimates!									
The data set for variable OS UG/KG PYRENE (so_sb) was not processed!									
It is suggested to collect at least 8 to 10 observations before using these statistical methods!									
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.									
OS UG/KG PYRENE (so_ss)									
General Statistics									
Number of Valid Data		40	Number of Detected Data		34				
Number of Distinct Detected Data		23	Number of Non-Detect Data		6				
Tolerance Factor		1.69	Percent Non-Detects		15.00%				
Number of Missing Values		75							
Raw Statistics					Log-transformed Statistics				
Minimum Detected		44	Minimum Detected		3.784				
Maximum Detected		190	Maximum Detected		5.247				
Mean of Detected		89.04	Mean of Detected		4.434				
SD of Detected		31.25	SD of Detected		0.334				
Minimum Non-Detect		230	Minimum Non-Detect		5.438				
Maximum Non-Detect		260	Maximum Non-Detect		5.561				
Data with Multiple Detection Limits					Single Detection Limit Scenario				
Note: Data have multiple DLs - Use of KM Method is recommen			Number treated as Non-Detect with Single DL		40				
For all methods (except KM, DL/2, and ROS Methods),			Number treated as Detected with Single DL		0				
Observations < Largest ND are treated as NDs			Single DL Non-Detect Percentage		100.00%				
Background Statistics									
Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only				
Shapiro Wilk Test Statistic		0.921	Shapiro Wilk Test Statistic		0.978				
5% Shapiro Wilk Critical Value		0.933	5% Shapiro Wilk Critical Value		0.933				
Data not Normal at 5% Significance Level					Data appear Lognormal at 5% Significance Level				
Assuming Normal Distribution					Assuming Lognormal Distribution				
DL/2 Substitution Method			DL/2 Substitution Method						
Mean		93.94	Mean (Log Scale)		4.489				
SD		31.19	SD (Log Scale)		0.335				
95% UTL 90% Coverage		146.6	95% UTL 90% Coverage		156.8				
95% UPL (t)		147.1	95% UPL (t)		157.7				
90% Percentile (z)		133.9	90% Percentile (z)		136.8				
95% Percentile (z)		145.2	95% Percentile (z)		154.5				
99% Percentile (z)		166.5	99% Percentile (z)		194.1				
Maximum Likelihood Estimate(MLE) Method		N/A	Log ROS Method						
			Mean in Original Scale		88.5				
			SD in Original Scale		29.3				
			Mean in Log Scale		4.434				
			SD in Log Scale		0.314				
			95% UTL 90% Coverage		143.2				
			95% UPL (t)		143.9				
			90% Percentile (z)		126				
			95% Percentile (z)		141.2				
			99% Percentile (z)		174.9				
Gamma Distribution Test with Detected Values Only					Data Distribution Test with Detected Values Only				
k star (bias corrected)		8.443	Data appear Gamma Distributed at 5% Significance Level						
Theta Star		10.55							
nu star		574.1							

Table 2
ProUCL Output

A-D Test Statistic		0.336	Nonparametric Statistics	
5% A-D Critical Value		0.748	Kaplan-Meier (KM) Method	
K-S Test Statistic		0.105	Mean	89.04
5% K-S Critical Value		0.151	SD	30.79
Data appear Gamma Distributed at 5% Significance Level			SE of Mean	5.359
Assuming Gamma Distribution			95% KM UTL with 90% Coverage	141.1
Gamma ROS Statistics with Extrapolated Data			95% KM Chebyshev UPL	224.9
Mean	89.72		95% KM UPL (t)	141.6
Median	87.25		90% Percentile (z)	128.5
SD	29.27		95% Percentile (z)	139.7
k star	9.684		99% Percentile (z)	160.7
Theta star	9.264		Gamma ROS Limits with Extrapolated Data	
Nu star	774.7		95% Wilson Hiferty (WH) Approx. Gamma UPL	142.7
95% Percentile of Chisquare (2k)	30.61		95% Hawkins Wixley (HW) Approx. Gamma UPL	143.4
			95% WH Approx. Gamma UTL with 90% Coverage	142.1
90% Percentile	128.1		95% HW Approx. Gamma UTL with 90% Coverage	142.8
95% Percentile	141.8			
99% Percentile	170			
Note: DL/2 is not a recommended method.				
OS UG/KG TOTAL PAHS (br_na)				
General Statistics				
Total Number of Observations	0	Number of Distinct Observations	0	
Tolerance Factor	N/A	Number of Missing Values	30	
Warning: This data set only has 0 observations!				
Data set is too small to compute reliable and meaningful statistics and estimates!				
The data set for variable OS UG/KG TOTAL PAHS (br_na) was not processed!				
It is suggested to collect at least 8 to 10 observations before using these statistical methods!				
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
OS UG/KG TOTAL PAHS (so_sb)				
General Statistics				
Total Number of Observations	0	Number of Distinct Observations	0	
Tolerance Factor	N/A	Number of Missing Values	100	
Warning: This data set only has 0 observations!				
Data set is too small to compute reliable and meaningful statistics and estimates!				
The data set for variable OS UG/KG TOTAL PAHS (so_sb) was not processed!				
It is suggested to collect at least 8 to 10 observations before using these statistical methods!				
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
OS UG/KG TOTAL PAHS (so_ss)				
General Statistics				
Number of Valid Data	40	Number of Detected Data	34	
Number of Distinct Detected Data	33	Number of Non-Detect Data	6	
Tolerance Factor	1.69	Percent Non-Detects	15.00%	
Number of Missing Values	75			
Raw Statistics		Log-transformed Statistics		

Table 2
ProUCL Output

			Minimum Detected	44				Minimum Detected	3.784	
			Maximum Detected	1264				Maximum Detected	7.142	
			Mean of Detected	323.2				Mean of Detected	5.443	
			SD of Detected	280.2				SD of Detected	0.841	
			Minimum Non-Detect	230				Minimum Non-Detect	5.438	
			Maximum Non-Detect	260				Maximum Non-Detect	5.561	
			Data with Multiple Detection Limits				Single Detection Limit Scenario			
			Note: Data have multiple DLs - Use of KM Method is recommen				Number treated as Non-Detect with Single DL	25		
			For all methods (except KM, DL/2, and ROS Methods),				Number treated as Detected with Single DL	15		
			Observations < Largest ND are treated as NDs				Single DL Non-Detect Percentage	62.50%		
			Background Statistics							
			Normal Distribution Test with Detected Values Only				Lognormal Distribution Test with Detected Values Only			
			Shapiro Wilk Test Statistic		0.819		Shapiro Wilk Test Statistic		0.954	
			5% Shapiro Wilk Critical Value		0.933		5% Shapiro Wilk Critical Value		0.933	
			Data not Normal at 5% Significance Level				Data appear Lognormal at 5% Significance Level			
			Assuming Normal Distribution				Assuming Lognormal Distribution			
			DL/2 Substitution Method				DL/2 Substitution Method			
			Mean		293		Mean (Log Scale)		5.346	
			SD		267.9		SD (Log Scale)		0.808	
			95% UTL 90% Coverage		745.6		95% UTL 90% Coverage		821.9	
			95% UPL (t)		749.9		95% UPL (t)		832.6	
			90% Percentile (z)		636.3		90% Percentile (z)		591	
			95% Percentile (z)		733.6		95% Percentile (z)		792.6	
			99% Percentile (z)		916.1		99% Percentile (z)		1375	
			Maximum Likelihood Estimate(MLE) Method				Log ROS Method			
			Mean		113.9		Mean in Original Scale		295.7	
			SD		450.7		SD in Original Scale		266.5	
			95% UTL with 90% Coverage		875.4		95% UTL with 90% Coverage		830.8	
							95% BCA UTL with 90% Coverage		710.1	
							95% Bootstrap (%) UTL with 90% Coverage		741.1	
			95% UPL (t)		882.6		95% UPL (t)		841.6	
			90% Percentile (z)		691.4		90% Percentile (z)		598	
			95% Percentile (z)		855.2		95% Percentile (z)		801.3	
			99% Percentile (z)		1162		99% Percentile (z)		1387	
			Gamma Distribution Test with Detected Values Only				Data Distribution Test with Detected Values Only			
			k star (bias corrected)		1.512		Data appear Lognormal at 5% Significance Level			
			Theta Star		213.7					
			nu star		102.8					
			A-D Test Statistic		0.945		Nonparametric Statistics			
			5% A-D Critical Value		0.764		Kaplan-Meier (KM) Method			
			K-S Test Statistic		0.188		Mean			294.3
			5% K-S Critical Value		0.154		SD			264.2
			Data not Gamma Distributed at 5% Significance Level				SE of Mean			42.51
							95% KM UTL with 90% Coverage			740.7
			Assuming Gamma Distribution				95% KM Chebyshev UPL			1460
			Gamma ROS Statistics with Extrapolated Data				95% KM UPL (t)			744.9
			Mean		299.7		90% Percentile (z)			632.9
			Median		171.7		95% Percentile (z)			728.8
			SD		266.5		99% Percentile (z)			908.9
			k star		1.472					
			Theta star		203.6		Gamma ROS Limits with Extrapolated Data			
			Nu star		117.7		95% Wilson Hilferty (WH) Approx. Gamma UPL			793.2
			95% Percentile of Chisquare (2k)		7.716		95% Hawkins Wixley (HW) Approx. Gamma UPL			813.7
							95% WH Approx. Gamma UTL with 90% Coverage			785.9
			90% Percentile		627.4		95% HW Approx. Gamma UTL with 90% Coverage			805.5
			95% Percentile		785.7					
			99% Percentile		1144					

Table 2
ProUCL Output

Note: DL/2 is not a recommended method.			
OV UG/KG HEXACHLOROBUTADIENE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OV UG/KG HEXACHLOROBUTADIENE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OV UG/KG HEXACHLOROBUTADIENE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OV UG/KG HEXACHLOROBUTADIENE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OV UG/KG HEXACHLOROBUTADIENE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OV UG/KG HEXACHLOROBUTADIENE (so_ss) was not processed!			
OV UG/KG TOTAL CHLORINATED VOCS (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OV UG/KG TOTAL CHLORINATED VOCS (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			

Table 2
ProUCL Output

OV UG/KG TOTAL CHLORINATED VOCS (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable OV UG/KG TOTAL CHLORINATED VOCS (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
OV UG/KG TOTAL CHLORINATED VOCS (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable OV UG/KG TOTAL CHLORINATED VOCS (so_ss) was not processed!			
PEST/PCB UG/KG 4,4'-DDD (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG 4,4'-DDD (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG 4,4'-DDD (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG 4,4'-DDD (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG 4,4'-DDD (so_ss)			

Table 2
ProUCL Output

	General Statistics											
	Number of Valid Data	40		Number of Detected Data	0							
	Number of Distinct Detected Data	0		Number of Non-Detect Data	40							
	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
	The data set for variable PEST/PCB UG/KG 4,4'-DDD (so_ss) was not processed!											
	PEST/PCB UG/KG 4,4'-DDE (br_na)											
	General Statistics											
	Total Number of Observations	0		Number of Distinct Observations	0							
	Tolerance Factor	N/A		Number of Missing Values	30							
	Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable PEST/PCB UG/KG 4,4'-DDE (br_na) was not processed!											
	It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
	PEST/PCB UG/KG 4,4'-DDE (so_sb)											
	General Statistics											
	Total Number of Observations	0		Number of Distinct Observations	0							
	Tolerance Factor	N/A		Number of Missing Values	100							
	Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable PEST/PCB UG/KG 4,4'-DDE (so_sb) was not processed!											
	It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
	PEST/PCB UG/KG 4,4'-DDE (so_ss)											
	General Statistics											
	Number of Valid Data	40		Number of Detected Data	6							
	Number of Distinct Detected Data	6		Number of Non-Detect Data	34							
	Tolerance Factor	1.69		Percent Non-Detects	85.00%							
	Number of Missing Values	75										
	Raw Statistics						Log-transformed Statistics					
	Minimum Detected	5.4		Minimum Detected	1.686							
	Maximum Detected	43		Maximum Detected	3.761							
	Mean of Detected	20.57		Mean of Detected	2.807							
	SD of Detected	14.08		SD of Detected	0.751							
	Minimum Non-Detect	3.4		Minimum Non-Detect	1.224							
	Maximum Non-Detect	6.2		Maximum Non-Detect	1.825							
	Data with Multiple Detection Limits						Single Detection Limit Scenario					
	Note: Data have multiple DLs - Use of KM Method is recommen						Number treated as Non-Detect with Single DL					
	For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL					

Table 2
ProUCL Output

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Table 2
ProUCL Output

PEST/PCB UG/KG 4,4'-DDT (br_na)											
General Statistics											
Total Number of Observations				0		Number of Distinct Observations				0	
Tolerance Factor				N/A		Number of Missing Values				30	
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable PEST/PCB UG/KG 4,4'-DDT (br_na) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
PEST/PCB UG/KG 4,4'-DDT (so_sb)											
General Statistics											
Total Number of Observations				0		Number of Distinct Observations				0	
Tolerance Factor				N/A		Number of Missing Values				100	
Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable PEST/PCB UG/KG 4,4'-DDT (so_sb) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
PEST/PCB UG/KG 4,4'-DDT (so_ss)											
General Statistics											
Number of Valid Data				40		Number of Detected Data				5	
Number of Distinct Detected Data				5		Number of Non-Detect Data				35	
Tolerance Factor				1.69		Percent Non-Detects				87.50%	
Number of Missing Values				75							
Raw Statistics						Log-transformed Statistics					
Minimum Detected				3.6		Minimum Detected				1.281	
Maximum Detected				23		Maximum Detected				3.135	
Mean of Detected				11.34		Mean of Detected				2.21	
SD of Detected				8.04		SD of Detected				0.755	
Minimum Non-Detect				4.5		Minimum Non-Detect				1.504	
Maximum Non-Detect				6.2		Maximum Non-Detect				1.825	
Data with Multiple Detection Limits						Single Detection Limit Scenario					
Note: Data have multiple DLs - Use of KM Method is recommen						Number treated as Non-Detect with Single DL				37	
For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL				3	
Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage				92.50%	
Warning: There are only 5 Detected Values in this data											
Note: It should be noted that even though bootstrap may be performed on this data set											
the resulting calculations may not be reliable enough to draw conclusions											
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.											
Background Statistics											
Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only					
Shapiro Wilk Test Statistic				0.917		Shapiro Wilk Test Statistic				0.969	
5% Shapiro Wilk Critical Value				0.762		5% Shapiro Wilk Critical Value				0.762	

Table 2
ProUCL Output

Data appear Normal at 5% Significance Level				Data appear Lognormal at 5% Significance Level			
Assuming Normal Distribution				Assuming Lognormal Distribution			
DL/2 Substitution Method				DL/2 Substitution Method			
Mean 3.626				Mean (Log Scale) 1.085			
SD 3.921				SD (Log Scale) 0.498			
95% UTL 90% Coverage 10.25				95% UTL 90% Coverage 6.858			
95% UPL (t) 10.31				95% UPL (t) 6.912			
90% Percentile (z) 8.65				90% Percentile (z) 5.597			
95% Percentile (z) 10.07				95% Percentile (z) 6.706			
99% Percentile (z) 12.75				99% Percentile (z) 9.413			
Maximum Likelihood Estimate(MLE) Method				Log ROS Method			
Mean 17.23				Mean in Original Scale 4.193			
SD 5.921				SD in Original Scale 3.95			
95% UTL with 90% Coverage 27.23				95% UTL with 90% Coverage 9.271			
				95% BCA UTL with 90% Coverage 9.25			
				95% Bootstrap (%) UTL with 90% Coverage 9.95			
95% UPL (t) 27.33				95% UPL (t) 9.36			
90% Percentile (z) 24.81				90% Percentile (z) 7.256			
95% Percentile (z) 26.96				95% Percentile (z) 9.024			
99% Percentile (z) 31				99% Percentile (z) 13.58			
Gamma Distribution Test with Detected Values Only				Data Distribution Test with Detected Values Only			
k star (bias corrected) 1.112				Data appear Normal at 5% Significance Level			
Theta Star 10.19							
nu star 11.12							
A-D Test Statistic 0.237				Nonparametric Statistics			
5% A-D Critical Value 0.684				Kaplan-Meier (KM) Method			
K-S Test Statistic 0.184				Mean 4.57			
5% K-S Critical Value 0.36				SD 3.608			
Data appear Gamma Distributed at 5% Significance Level				SE of Mean 0.638			
Assuming Gamma Distribution				95% KM UTL with 90% Coverage 10.67			
Gamma ROS Statistics with Extrapolated Data				95% KM Chebyshev UPL 20.49			
Mean 4.281				95% KM UPL (t) 10.72			
Median 2.423				90% Percentile (z) 9.194			
SD 4.819				95% Percentile (z) 10.5			
k star 0.184				99% Percentile (z) 12.96			
Theta star 23.33				Gamma ROS Limits with Extrapolated Data			
Nu star 14.68				95% Wilson Hiferty (WH) Approx. Gamma UPL 19.34			
95% Percentile of Chisquare (2k) 1.933				95% Hawkins Wixley (HW) Approx. Gamma UPL 26.79			
				95% WH Approx. Gamma UTL with 90% Coverage 19.05			
90% Percentile 12.92				95% HW Approx. Gamma UTL with 90% Coverage 26.27			
95% Percentile 22.54							
99% Percentile 49.41							
Note: DL/2 is not a recommended method.							
PEST/PCB UG/KG ALDRIN (br_na)							
General Statistics							
Total Number of Observations 0				Number of Distinct Observations 0			
Tolerance Factor N/A				Number of Missing Values 30			
Warning: This data set only has 0 observations!							
Data set is too small to compute reliable and meaningful statistics and estimates!							
The data set for variable PEST/PCB UG/KG ALDRIN (br_na) was not processed!							
It is suggested to collect at least 8 to 10 observations before using these statistical methods!							
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.							

Table 2
ProUCL Output

PEST/PCB UG/KG ALDRIN (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ALDRIN (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG ALDRIN (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).			
The data set for variable PEST/PCB UG/KG ALDRIN (so_ss) was not processed!			
PEST/PCB UG/KG ALPHA-BHC (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ALPHA-BHC (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG ALPHA-BHC (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ALPHA-BHC (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			

Table 2
ProUCL Output

PEST/PCB UG/KG ALPHA-BHC (so_ss)													
General Statistics													
Number of Valid Data						40	Number of Detected Data						0
Number of Distinct Detected Data						0	Number of Non-Detect Data						40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).													
The data set for variable PEST/PCB UG/KG ALPHA-BHC (so_ss) was not processed!													
PEST/PCB UG/KG ALPHA-CHLORDANE (br_na)													
General Statistics													
Total Number of Observations						0	Number of Distinct Observations						0
Tolerance Factor						N/A	Number of Missing Values						30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable PEST/PCB UG/KG ALPHA-CHLORDANE (br_na) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
PEST/PCB UG/KG ALPHA-CHLORDANE (so_sb)													
General Statistics													
Total Number of Observations						0	Number of Distinct Observations						0
Tolerance Factor						N/A	Number of Missing Values						100
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable PEST/PCB UG/KG ALPHA-CHLORDANE (so_sb) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
PEST/PCB UG/KG ALPHA-CHLORDANE (so_ss)													
General Statistics													
Number of Valid Data						40	Number of Detected Data						3
Number of Distinct Detected Data						3	Number of Non-Detect Data						37
Warning: Data set has only 3 Detected Values. This is not enough to compute meaningful and reliable test statistics and estimates. No statistics will be produced!													
Tolerance Factor						1.69	Percent Non-Detects						92.50%
Number of Missing Values						75							
Raw Statistics						Log-transformed Statistics							
Minimum Detected						3.8	Minimum Detected						1.335
Maximum Detected						7	Maximum Detected						1.946
Mean of Detected						5.8	Mean of Detected						1.723
SD of Detected						1.744	SD of Detected						0.337

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

<p>It is suggested to collect at least 8 to 10 observations before using these statistical methods!</p> <p>If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.</p>			
<p>PEST/PCB UG/KG AROCLOR-1221 (so_sb)</p>			
<p>General Statistics</p>			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
<p>Warning: This data set only has 0 observations!</p> <p>Data set is too small to compute reliable and meaningful statistics and estimates!</p> <p>The data set for variable PEST/PCB UG/KG AROCLOR-1221 (so_sb) was not processed!</p>			
<p>It is suggested to collect at least 8 to 10 observations before using these statistical methods!</p> <p>If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.</p>			
<p>PEST/PCB UG/KG AROCLOR-1221 (so_ss)</p>			
<p>General Statistics</p>			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
<p>Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!</p> <p>Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!</p> <p>The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).</p> <p>The data set for variable PEST/PCB UG/KG AROCLOR-1221 (so_ss) was not processed!</p>			
<p>PEST/PCB UG/KG AROCLOR-1232 (br_na)</p>			
<p>General Statistics</p>			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
<p>Warning: This data set only has 0 observations!</p> <p>Data set is too small to compute reliable and meaningful statistics and estimates!</p> <p>The data set for variable PEST/PCB UG/KG AROCLOR-1232 (br_na) was not processed!</p>			
<p>It is suggested to collect at least 8 to 10 observations before using these statistical methods!</p> <p>If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.</p>			
<p>PEST/PCB UG/KG AROCLOR-1232 (so_sb)</p>			
<p>General Statistics</p>			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
<p>Warning: This data set only has 0 observations!</p> <p>Data set is too small to compute reliable and meaningful statistics and estimates!</p> <p>The data set for variable PEST/PCB UG/KG AROCLOR-1232 (so_sb) was not processed!</p>			
<p>It is suggested to collect at least 8 to 10 observations before using these statistical methods!</p>			

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

PEST/PCB UG/KG AROCLOR-1248 (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG AROCLOR-1248 (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG AROCLOR-1248 (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG AROCLOR-1248 (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG AROCLOR-1248 (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable PEST/PCB UG/KG AROCLOR-1248 (so_ss) was not processed!			
PEST/PCB UG/KG AROCLOR-1254 (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG AROCLOR-1254 (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG AROCLOR-1254 (so_sb)			

Table 2
ProUCL Output

	General Statistics											
	Total Number of Observations	0		Number of Distinct Observations	0							
	Tolerance Factor	N/A		Number of Missing Values	100							
	Warning: This data set only has 0 observations!											
	Data set is too small to compute reliable and meaningful statistics and estimates!											
	The data set for variable PEST/PCB UG/KG AROCLOR-1254 (so_sb) was not processed!											
	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
	PEST/PCB UG/KG AROCLOR-1254 (so_ss)											
	General Statistics											
	Number of Valid Data	40		Number of Detected Data	1							
	Number of Distinct Detected Data	1		Number of Non-Detect Data	39							
	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!											
	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EP											
	The data set for variable PEST/PCB UG/KG AROCLOR-1254 (so_ss) was not processed!											
	PEST/PCB UG/KG AROCLOR-1260 (br_na)											
	General Statistics											
	Total Number of Observations	0		Number of Distinct Observations	0							
	Tolerance Factor	N/A		Number of Missing Values	30							
	Warning: This data set only has 0 observations!											
	Data set is too small to compute reliable and meaningful statistics and estimates!											
	The data set for variable PEST/PCB UG/KG AROCLOR-1260 (br_na) was not processed!											
	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
	PEST/PCB UG/KG AROCLOR-1260 (so_sb)											
	General Statistics											
	Total Number of Observations	0		Number of Distinct Observations	0							
	Tolerance Factor	N/A		Number of Missing Values	100							
	Warning: This data set only has 0 observations!											
	Data set is too small to compute reliable and meaningful statistics and estimates!											
	The data set for variable PEST/PCB UG/KG AROCLOR-1260 (so_sb) was not processed!											
	It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
	PEST/PCB UG/KG AROCLOR-1260 (so_ss)											
	General Statistics											
	Number of Valid Data	40		Number of Detected Data	6							
	Number of Distinct Detected Data	6		Number of Non-Detect Data	34							

Table 2
ProUCL Output[illegible]

Table 2
ProUCL Output

				Median	6.197					95% Percentile (z)	54.92	
				SD	22.28					99% Percentile (z)	61.95	
				k star	0.128							
				Theta star	136.3					Gamma ROS Limits with Extrapolated Data		
				Nu star	10.23					95% Wilson Hilferty (WH) Approx. Gamma UPL	83.05	
				95% Percentile of Chisquare (2k)	1.447					95% Hawkins Wixley (HW) Approx. Gamma UPL	110.6	
										95% WH Approx. Gamma UTL with 90% Coverage	81.64	
				90% Percentile	50.19					95% HW Approx. Gamma UTL with 90% Coverage	108.2	
				95% Percentile	98.59							
				99% Percentile	244							
				Note: DL/2 is not a recommended method.								
				PEST/PCB UG/KG BETA-BHC (br_na)								
				General Statistics								
				Total Number of Observations	0					Number of Distinct Observations	0	
				Tolerance Factor	N/A					Number of Missing Values	30	
				Warning: This data set only has 0 observations!								
				Data set is too small to compute reliable and meaningful statistics and estimates!								
				The data set for variable PEST/PCB UG/KG BETA-BHC (br_na) was not processed!								
				It is suggested to collect at least 8 to 10 observations before using these statistical methods!								
				If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.								
				PEST/PCB UG/KG BETA-BHC (so_sb)								
				General Statistics								
				Total Number of Observations	0					Number of Distinct Observations	0	
				Tolerance Factor	N/A					Number of Missing Values	100	
				Warning: This data set only has 0 observations!								
				Data set is too small to compute reliable and meaningful statistics and estimates!								
				The data set for variable PEST/PCB UG/KG BETA-BHC (so_sb) was not processed!								
				It is suggested to collect at least 8 to 10 observations before using these statistical methods!								
				If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.								
				PEST/PCB UG/KG BETA-BHC (so_ss)								
				General Statistics								
				Number of Valid Data	40					Number of Detected Data	0	
				Number of Distinct Detected Data	0					Number of Non-Detect Data	40	
				Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
				Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
				The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).								
				The data set for variable PEST/PCB UG/KG BETA-BHC (so_ss) was not processed!								
				PEST/PCB UG/KG DELTA-BHC (br_na)								
				General Statistics								
				Total Number of Observations	0					Number of Distinct Observations	0	

Table 2
ProUCL Output

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Table 2
ProUCL Output

Warning: This data set only has 0 observations!											
Data set is too small to compute reliable and meaningful statistics and estimates!											
The data set for variable PEST/PCB UG/KG DIELDRIN (so_sb) was not processed!											
It is suggested to collect at least 8 to 10 observations before using these statistical methods!											
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.											
PEST/PCB UG/KG DIELDRIN (so_ss)											
General Statistics											
Number of Valid Data				40		Number of Detected Data				2	
Number of Distinct Detected Data				2		Number of Non-Detect Data				38	
Warning: Data set has only 2 Detected Values.											
This is not enough to compute meaningful and reliable test statistics and estimates.											
No statistics will be produced!											
Tolerance Factor				1.69		Percent Non-Detects				95.00%	
Number of Missing Values				75							
Raw Statistics						Log-transformed Statistics					
Minimum Detected				13		Minimum Detected				2.565	
Maximum Detected				26		Maximum Detected				3.258	
Mean of Detected				19.5		Mean of Detected				2.912	
SD of Detected				9.192		SD of Detected				0.49	
Minimum Non-Detect				3.4		Minimum Non-Detect				1.224	
Maximum Non-Detect				6.2		Maximum Non-Detect				1.825	
Data with Multiple Detection Limits						Single Detection Limit Scenario					
Note: Data have multiple DLs - Use of KM Method is recommen						Number treated as Non-Detect with Single DL				38	
For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL				2	
Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage				95.00%	
Warning: Data set has only 2 Distinct Detected Values.											
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.											
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.											
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.											
Those methods will return a 'N/A' value on your output display!											
It is necessary to have 4 or more Distinct Values for bootstrap methods.											
However, results obtained using 4 to 9 distinct values may not be reliable.											
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.											
Background Statistics											
Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only					
Shapiro Wilk Test Statistic				N/A		Shapiro Wilk Test Statistic				N/A	
5% Shapiro Wilk Critical Value				N/A		5% Shapiro Wilk Critical Value				N/A	
Data not Normal at 5% Significance Level						Data not Lognormal at 5% Significance Level					
Assuming Normal Distribution						Assuming Lognormal Distribution					
DL/2 Substitution Method						DL/2 Substitution Method					
Mean				3.347		Mean (Log Scale)				1.011	
SD				4.036		SD (Log Scale)				0.457	
95% UTL 90% Coverage				10.17		95% UTL 90% Coverage				5.947	
95% UPL (t)				10.23		95% UPL (t)				5.99	
90% Percentile (z)				8.52		90% Percentile (z)				4.935	
95% Percentile (z)				9.986		95% Percentile (z)				5.826	
99% Percentile (z)				12.74		99% Percentile (z)				7.952	

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ENDOSULFAN II (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG ENDOSULFAN II (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).			
The data set for variable PEST/PCB UG/KG ENDOSULFAN II (so_ss) was not processed!			
PEST/PCB UG/KG ENDOSULFAN III (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ENDOSULFAN II (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG ENDOSULFAN III (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ENDOSULFAN III (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG ENDOSULFAN III (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW).			

Table 2
ProUCL Output

The data set for variable PEST/PCB UG/KG ENDOSULFAN II (so_ss) was not processed!			
PEST/PCB UG/KG ENDOSULFAN SULFATE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ENDOSULFAN SULFATE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG ENDOSULFAN SULFATE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ENDOSULFAN SULFATE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG ENDOSULFAN SULFATE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable PEST/PCB UG/KG ENDOSULFAN SULFATE (so_ss) was not processed!			
PEST/PCB UG/KG ENDRIN ALDEHYDE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ENDRIN ALDEHYDE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			

Table 2
ProUCL Output

PEST/PCB UG/KG ENDRIN ALDEHYDE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ENDRIN ALDEHYDE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG ENDRIN ALDEHYDE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable PEST/PCB UG/KG ENDRIN ALDEHYDE (so_ss) was not processed!			
PEST/PCB UG/KG ENDRIN KETONE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ENDRIN KETONE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG ENDRIN KETONE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG ENDRIN KETONE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			

Table 2
ProUCL Output

PEST/PCB UG/KG ENDRIN KETONE (so_ss)													
General Statistics													
Number of Valid Data						40	Number of Detected Data						0
Number of Distinct Detected Data						0	Number of Non-Detect Data						40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!													
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!													
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).													
The data set for variable PEST/PCB UG/KG ENDRIN KETONE (so_ss) was not processed!													
PEST/PCB UG/KG ENDRIN (br_na)													
General Statistics													
Total Number of Observations						0	Number of Distinct Observations						0
Tolerance Factor						N/A	Number of Missing Values						30
Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable PEST/PCB UG/KG ENDRIN (br_na) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
PEST/PCB UG/KG ENDRIN (so_sb)													
General Statistics													
Total Number of Observations						0	Number of Distinct Observations						0
Tolerance Factor						N/A	Number of Missing Values						100
Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable PEST/PCB UG/KG ENDRIN (so_sb) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
PEST/PCB UG/KG ENDRIN (so_ss)													
General Statistics													
Number of Valid Data						40	Number of Detected Data						0
Number of Distinct Detected Data						0	Number of Non-Detect Data						40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!													
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!													
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).													
The data set for variable PEST/PCB UG/KG ENDRIN (so_ss) was not processed!													
PEST/PCB UG/KG GAMMA-BHC (LINDANE) (br_na)													
General Statistics													
Total Number of Observations						0	Number of Distinct Observations						0

Table 2
ProUCL Output

	Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!				
Data set is too small to compute reliable and meaningful statistics and estimates!				
The data set for variable PEST/PCB UG/KG GAMMA-BHC (LINDANE) (br_na) was not processed!				
It is suggested to collect at least 8 to 10 observations before using these statistical methods!				
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
PEST/PCB UG/KG GAMMA-BHC (LINDANE) (so_sb)				
General Statistics				
Total Number of Observations	0	Number of Distinct Observations	0	
Tolerance Factor	N/A	Number of Missing Values	100	
Warning: This data set only has 0 observations!				
Data set is too small to compute reliable and meaningful statistics and estimates!				
The data set for variable PEST/PCB UG/KG GAMMA-BHC (LINDANE) (so_sb) was not processed!				
It is suggested to collect at least 8 to 10 observations before using these statistical methods!				
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
PEST/PCB UG/KG GAMMA-BHC (LINDANE) (so_ss)				
General Statistics				
Number of Valid Data	40	Number of Detected Data	0	
Number of Distinct Detected Data	0	Number of Non-Detect Data	40	
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!				
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!				
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).				
The data set for variable PEST/PCB UG/KG GAMMA-BHC (LINDANE) (so_ss) was not processed!				
PEST/PCB UG/KG GAMMA-CHLORDANE (br_na)				
General Statistics				
Total Number of Observations	0	Number of Distinct Observations	0	
Tolerance Factor	N/A	Number of Missing Values	30	
Warning: This data set only has 0 observations!				
Data set is too small to compute reliable and meaningful statistics and estimates!				
The data set for variable PEST/PCB UG/KG GAMMA-CHLORDANE (br_na) was not processed!				
It is suggested to collect at least 8 to 10 observations before using these statistical methods!				
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.				
PEST/PCB UG/KG GAMMA-CHLORDANE (so_sb)				
General Statistics				
Total Number of Observations	0	Number of Distinct Observations	0	
Tolerance Factor	N/A	Number of Missing Values	100	

Table 2
ProUCL Output

Warning: This data set only has 0 observations!													
Data set is too small to compute reliable and meaningful statistics and estimates!													
The data set for variable PEST/PCB UG/KG GAMMA-CHLORDANE (so_sb) was not processed!													
It is suggested to collect at least 8 to 10 observations before using these statistical methods!													
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.													
PEST/PCB UG/KG GAMMA-CHLORDANE (so_ss)													
General Statistics													
Number of Valid Data				40	Number of Detected Data				3				
Number of Distinct Detected Data				3	Number of Non-Detect Data				37				
Warning: Data set has only 3 Detected Values.													
This is not enough to compute meaningful and reliable test statistics and estimates.													
No statistics will be produced!													
Tolerance Factor				1.69	Percent Non-Detects				92.50%				
Number of Missing Values				75									
Raw Statistics						Log-transformed Statistics							
Minimum Detected				2.8	Minimum Detected				1.03				
Maximum Detected				7.2	Maximum Detected				1.974				
Mean of Detected				4.733	Mean of Detected				1.48				
SD of Detected				2.248	SD of Detected				0.474				
Minimum Non-Detect				1.8	Minimum Non-Detect				0.588				
Maximum Non-Detect				3.2	Maximum Non-Detect				1.163				
Data with Multiple Detection Limits						Single Detection Limit Scenario							
Note: Data have multiple DLs - Use of KM Method is recommen						Number treated as Non-Detect with Single DL				38			
For all methods (except KM, DL/2, and ROS Methods),						Number treated as Detected with Single DL				2			
Observations < Largest ND are treated as NDs						Single DL Non-Detect Percentage				95.00%			
Warning: There are only 3 Distinct Detected Values in this data set													
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.													
Those methods will return a 'N/A' value on your output display!													
It is necessary to have 4 or more Distinct Values for bootstrap methods.													
However, results obtained using 4 to 9 distinct values may not be reliable.													
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.													
Background Statistics													
Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only							
Shapiro Wilk Test Statistic				0.958	Shapiro Wilk Test Statistic				0.993				
5% Shapiro Wilk Critical Value				0.767	5% Shapiro Wilk Critical Value				0.767				
Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level							
Assuming Normal Distribution						Assuming Lognormal Distribution							
DL/2 Substitution Method					DL/2 Substitution Method								
Mean				1.541	Mean (Log Scale)				0.337				
SD				1.057	SD (Log Scale)				0.356				
95% UTL 90% Coverage				3.327	95% UTL 90% Coverage				2.558				
95% UPL (t)				3.344	95% UPL (t)				2.572				
90% Percentile (z)				2.895	90% Percentile (z)				2.212				
95% Percentile (z)				3.279	95% Percentile (z)				2.517				
99% Percentile (z)				3.999	99% Percentile (z)				3.209				
Maximum Likelihood Estimate(MLE) Method						N/A	Log ROS Method						
							Mean in Original Scale				0.648		
							SD in Original Scale				1.316		
							Mean in Log Scale				-1.356		

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

PEST/PCB UG/KG HEPTACHLOR EPOXIDE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable PEST/PCB UG/KG HEPTACHLOR EPOXIDE (so_ss) was not processed!			
PEST/PCB UG/KG HEPTACHLOR (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable PEST/PCB UG/KG HEPTACHLOR (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG HEPTACHLOR (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations! Data set is too small to compute reliable and meaningful statistics and estimates! The data set for variable PEST/PCB UG/KG HEPTACHLOR (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods! If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG HEPTACHLOR (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable PEST/PCB UG/KG HEPTACHLOR (so_ss) was not processed!			
PEST/PCB UG/KG METHOXYCHLOR (br_na)			

Table 2
ProUCL Output

General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG METHOXYCHLOR (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG METHOXYCHLOR (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG METHOXYCHLOR (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG METHOXYCHLOR (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable PEST/PCB UG/KG METHOXYCHLOR (so_ss) was not processed!			
PEST/PCB UG/KG TOTAL AROCLOR (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG TOTAL AROCLOR (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG TOTAL AROCLOR (so_sb)			
General Statistics			

Table 2
ProUCL Output

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Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

[illegible]

Table 2
ProUCL Output

Data appear Gamma Distributed at 5% Significance Level		SE of Mean	2.072
		95% KM UTL with 90% Coverage	27.98
Assuming Gamma Distribution		95% KM Chebyshev UPL	61.02
Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	28.17
Mean	6.939	90% Percentile (z)	23.03
Median	1E-06	95% Percentile (z)	27.43
SD	13.39	99% Percentile (z)	35.7
k star	0.102		
Theta star	67.86	Gamma ROS Limits with Extrapolated Data	
Nu star	8.18	95% Wilson Hilferty (WH) Approx. Gamma UPL	30.46
95% Percentile of Chisquare (2k)	1.185	95% Hawkins Wixley (HW) Approx. Gamma UPL	35.92
		95% WH Approx. Gamma UTL with 90% Coverage	29.88
90% Percentile	18.64	95% HW Approx. Gamma UTL with 90% Coverage	35.03
95% Percentile	40.22		
99% Percentile	109		
Note: DL/2 is not a recommended method.			
PEST/PCB UG/KG TOXAPHENE (br_na)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	30
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG TOXAPHENE (br_na) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG TOXAPHENE (so_sb)			
General Statistics			
Total Number of Observations	0	Number of Distinct Observations	0
Tolerance Factor	N/A	Number of Missing Values	100
Warning: This data set only has 0 observations!			
Data set is too small to compute reliable and meaningful statistics and estimates!			
The data set for variable PEST/PCB UG/KG TOXAPHENE (so_sb) was not processed!			
It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
PEST/PCB UG/KG TOXAPHENE (so_ss)			
General Statistics			
Number of Valid Data	40	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	40
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTW),			
The data set for variable PEST/PCB UG/KG TOXAPHENE (so_ss) was not processed!			

TABLE 1

UPPER PREDICTION LIMITS FOR SELECTED METALS
BASEWIDE BACKGROUND STUDY
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

	RIDEM Res DEC	Surface Soils		Subsurface Soils	
		UPL	Statistic Type	UPL	Statistic Type
Aluminum	NC	16020	Nonparametric statistic - 95% UPL	13075	Nonparametric statistic - 95% UPL
Arsenic	7	13 ¹	Gamma distributed - 95% WH Approx. Gamma UPL	20 ²	Nonparametric statistic - 95% UPL
Chromium	1400	16	Nonparametric statistic - 95% UPL	18	Normal distribution - 95% UPL
Cobalt	NC	8.89	Gamma distributed - 95% WH Approx. Gamma UPL	17	Nonparametric statistic - 95% UPL
Iron	NC	24200	Nonparametric statistic - 95% UPL	39173	Lognormal distribution - 95% UPL
Manganese	390	349	Lognormal distribution - 95% UPL	1037	Nonparametric statistic - 95% UPL

NOTES:

¹ - Beach and Stissing Silt Loam datasets removed per RIDEM comment.

² - Mansfield Mucky Silt Loam and Stidding Silt Loam datasets removed per RIDEM comment.

Units are mg/kg.

NC = no criteria

UPL = Upper Prediction Limit

APPENDIX H

FORMER USMC TRAILER LOCATION, FINAL SITE CLEANUP

04 June 2012

Former USMC Trailer Location, Coddington Cove
Naval Station Newport
Final Site Clean Up

Clean Up Requirements

Final Clean Up requirements are based on inspection observations.

The intent of this document is to serve as the basis in developing a Statement of Work for a Design Build Contract for a project to execute the required final cleanup of the site.

Site Information/Background:

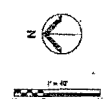
1. Site is an active Installation Remediation (IR) site.
2. Approx 3 years ago (Summer 2009) , site had 2 feet of clean soil put down on the top of the site from another construction site on the installation
3. The site was then used for 2 years by the USMC, whereupon approximately 9 trailers were located and a parking lot of crushed stone were constructed.

Clean Up requirements include:

1. Remove abandoned buried electrical conduits, water line, septic tank and piping, and fence posts.
2. While conducting work, contractor shall have a person on site full time who has completed the 40 hour Hazwopper training. Provide copy of certificate to Govt for review prior to start of work.
3. Prior to start of work, provide a soil and sediment erosion control plan to Govt for review prior to start of work. Plan shall include a sketch and written plan. Govt shall submit plan to RI-CRMC for review. Work shall not start until receipt of RI-CRMC approval.
4. Obtain Dig Safe prior to start of work.
5. If any material is recycled, report quantities to Govt.
6. All clean soil brought to site or removed from the site shall conform with Remediation Regulations for Residential standards.
7. When refilling excavated areas, final 6" lift (or cap) shall consist of certified new clean soil.
8. Provide approved grass seed on disturbed areas at completion of project.

Refer to Sketch for approximate locations, quantities and sizes.

Cost Estimate - The Government Estimate is attached.



SIZE	CODE IDENT NO.	NAVPAC DRAWING NO.	
A	80091	CONSTR. CONTR. NO.	
SCALE: NONE	SPEC.	SHEET 1 OF 1	

APPENDIX I
HISTORIC DATASET

TABLE
ANALYTICAL RESULTS - GROUNDWATER (GW_GW)
FORMER DEREKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 of 8

SAMPLE ID	DSY-A-MW02-01	DSY-A-MW03-01	DSY-A-MW03-01-D	DSY-A-MW04-01	DSY-A-MW05-01	DSY-A-MW07-01	DSY-A-MW08-01	DSY-A-MW08-01-D	DSY-A-MW09-01	DSY-A-MW104-01	DSY-A-MW11-01	DSY-A-MW12-01
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-07	DSY-MW-08	DSY-MW-08	DSY-MW-09	DSY-MW-104	DSY-MW-11	DSY-MW-12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/L)												
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	10 U	10 J	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	40 U
BENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLORODIBROMOMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - GROUNDWATER (GW_GW)
FORMER DEREKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 of 8

SAMPLE ID	DSY-A-MW02-01	DSY-A-MW03-01	DSY-A-MW03-01-D	DSY-A-MW04-01	DSY-A-MW05-01	DSY-A-MW07-01	DSY-A-MW08-01	DSY-A-MW08-01-D	DSY-A-MW09-01	DSY-A-MW104-01	DSY-A-MW11-01	DSY-A-MW12-01
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-07	DSY-MW-08	DSY-MW-08	DSY-MW-09	DSY-MW-104	DSY-MW-11	DSY-MW-12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	12 U	10 U	10 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
STYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL 1,2-DICHLOROETHENE	5 J	10 U	10 U	10 U	10 U	10 U	13	10 U	10 U	180	18	16
TOTAL XYLENES	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	10 U	32	33	10 U	10 U	10 U	4 J	10 U	3 J	10 U	10 U	16
VINYL CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100	10 U	10 U
SEMIVOLATILES (UG/L)												
1,2,4-TRICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

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LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-07	DSY-MW-08	DSY-MW-08	DSY-MW-09	DSY-MW-104	DSY-MW-11	DSY-MW-12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2-NITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-DICHLOROBENZIDINE	10 U	10 UJ	10 UJ	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
3-NITROANILINE	25 U	25 UJ	25 UJ	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-BROMOPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROANILINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-NITROANILINE	25 U	25 UJ	25 UJ	25 U	25 U	25 U	25 UJ	25 UJ	25 U	25 U	25 UJ	25 U
4-NITROPHENOL	25 UJ	25 U	25 U	25 UJ	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
ACENAPHTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - GROUNDWATER (GW_GW)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-A-MW02-01	DSY-A-MW03-01	DSY-A-MW03-01-D	DSY-A-MW04-01	DSY-A-MW05-01	DSY-A-MW07-01	DSY-A-MW08-01	DSY-A-MW08-01-D	DSY-A-MW09-01	DSY-A-MW104-01	DSY-A-MW11-01	DSY-A-MW12-01
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-07	DSY-MW-08	DSY-MW-08	DSY-MW-09	DSY-MW-104	DSY-MW-11	DSY-MW-12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHOXY)METHAN E	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	13 U	10 U
BUTYL BENZYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBAZOLE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHRYSENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIBENZO(A,H)ANTHRACEN E	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIBENZOFURAN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIMETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-OCTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

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FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-A-MW02-01	DSY-A-MW03-01	DSY-A-MW03-01-D	DSY-A-MW04-01	DSY-A-MW05-01	DSY-A-MW07-01	DSY-A-MW08-01	DSY-A-MW08-01-D	DSY-A-MW09-01	DSY-A-MW104-01	DSY-A-MW11-01	DSY-A-MW12-01
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-07	DSY-MW-08	DSY-MW-08	DSY-MW-09	DSY-MW-104	DSY-MW-11	DSY-MW-12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HIGH MOLECULAR WEIGHT PAHS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ISOPHORONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
LOW MOLECULAR WEIGHT PAHS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
NAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
NITROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSODIPHENYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PENTACHLOROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
PHENANTHRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL PAHS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PESTICIDES/PCBS (UG/L)												
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

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FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-A-MW02-01	DSY-A-MW03-01	DSY-A-MW03-01-D	DSY-A-MW04-01	DSY-A-MW05-01	DSY-A-MW07-01	DSY-A-MW08-01	DSY-A-MW08-01-D	DSY-A-MW09-01	DSY-A-MW104-01	DSY-A-MW11-01	DSY-A-MW12-01
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-07	DSY-MW-08	DSY-MW-08	DSY-MW-09	DSY-MW-104	DSY-MW-11	DSY-MW-12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
AROCLOR-1016	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR-1221	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
AROCLOR-1232	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR-1242	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR-1248	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR-1254	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
AROCLOR-1260	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN SULFATE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN KETONE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
METHOXYCHLOR	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
PCB-209	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SUM OF PCB CONGENERS X 2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

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LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-07	DSY-MW-08	DSY-MW-08	DSY-MW-09	DSY-MW-104	DSY-MW-11	DSY-MW-12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOXAPHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METALS (UG/L)												
ALUMINUM	48.8 U	227 U	59 U	43.9 U	16 U	1240	102 U	33.7 U	1010	88.9 U	100 U	66.5 U
ANTIMONY	52 U	52 UJ	52 UJ	52 U	52 U	52 U	52 U	52 U	52 U	52 U	52 UJ	52 U
ARSENIC	4 U	6.3 J	4.3 J	5.1 J	4 U	57.6	15.6	4 U	4 U	19.8	13.2	4 U
BARIUM	44.4	11.8 U	10.4 U	33.5 U	49.1	51.7	33.9 U	11.5 U	99.3	44.6	15.8	11.2 U
BERYLLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CADMIUM	3 U	3 UJ	3 UJ	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 UJ	3 U
CALCIUM	62500	25200	22100	80200	126000	14100	28400	34700	42000	46900	51300	22000
CHROMIUM	6 U	6 U	6 U	6 U	6 U	12.8 J	30.3 J	7.5 J	57.6 J	7.2 J	7.3 J	6 U
COBALT	3 U	5.4 UJ	3.6 UJ	3 U	3.9 UJ	4.5 UJ	18.5 UJ	3.4 UJ	7.8 UJ	12.3 UJ	4.5 UJ	3 U
COPPER	5 U	5.4 J	5.8 J	5 U	5 U	5 U	5 U	5 U	5.9 J	12.7	5 U	5 U
IRON	205 U	540 J	78.3 J	134 U	1260	18400	5660	140 U	2600	1880	414 J	216 U
LEAD	1 U	1 U	5.9 UJ	1 U	1 U	1.8 J	1 U	1 U	1 U	14.6	1 U	1 U
MAGNESIUM	31600	12600	11100	6700	40000	5430	6530	13400	12800	7470	13000	24000
MANGANESE	230	30	19.9 U	371	1360	753	3410	20.5	830	4300	373	125
MERCURY	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL	9 U	9 U	11.4 J	9 U	10.3 UJ	11.3 UJ	18.4 U	9 U	34.6 U	20.6 U	9.6 J	9 U
POTASSIUM	17100	2020	1780	3050	2490	3570	3990	1440	7650	3510	5890	15700
SELENIUM	4 U	4 UJ	4 UJ	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 UJ	4 U
SILVER	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ
SODIUM	200000	75700	67100	29700	379000	142000	45000	32000	103000	119000	80100	60300
THALLIUM	6 U	6 UJ	6 UJ	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 UJ	6 U
VANADIUM	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
ZINC	68.3	23.7	19.9	17.3 U	3.9 UJ	26.4 U	33.6 U	52.1 U	22.4 U	14.2 U	21.3	15.2 U

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LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-07	DSY-MW-08	DSY-MW-08	DSY-MW-09	DSY-MW-104	DSY-MW-11	DSY-MW-12
SAMPLE DATE	09/11/96	09/10/96	09/10/96	09/11/96	09/11/96	09/11/96	09/12/96	09/12/96	09/11/96	09/12/96	09/10/96	09/10/96
TOP DEPTH												
BOTTOM DEPTH												
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MISCELLANEOUS PARAMETERS (UG/L)												
DIBUTYLTIN	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 U	1 UJ	1 U
MONOBUTYLTIN	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.16 J	1 UJ	1 U	1 UJ	1 U
TETRABUTYLTIN	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 U	1 UJ	1 U
TRIBUTYLTIN	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 U	1 UJ	1 U
PETROLEUM HYDROCARBONS (MG/L)												
CREOSOTE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U

TABLE
ANALYTICAL RESULTS - (SO_NA)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 of 2

SAMPLE ID	TP14W-2	DSY-FDPB	DSY-FDPE	DSY-FDPN	DSY-FDPS	DSY-FDPW	DPSOIL04
LOCATION ID	DSY-TP-14	DSY-TP-25	DSY-TP-25	DSY-TP-25	DSY-TP-25	DSY-TP-25	DSY-TP-DPSOIL
SAMPLE DATE	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/99
TOP DEPTH							
BOTTOM DEPTH							
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)							
TOLUENE	300	NA	NA	NA	NA	NA	NA
SEMIVOLATILES (UG/KG)							
ANTHRACENE	NA	NA	NA	NA	NA	NA	56 J
BENZO(A)ANTHRACENE	12000	NA	NA	NA	NA	NA	580
BENZO(A)PYRENE	10000	NA	NA	NA	NA	NA	560
BENZO(B)FLUORANTHENE	15000	NA	NA	NA	NA	NA	790
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	NA	300 J
BENZO(K)FLUORANTHENE	8200	NA	NA	NA	NA	NA	430
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	NA	NA	160 J
CHRYSENE	12000	NA	NA	NA	NA	NA	620
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA	NA	99 J
FLUORANTHENE	26000	NA	NA	NA	NA	NA	740
HIGH MOLECULAR WEIGHT PAHS	105200	NA	NA	NA	NA	NA	5239
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	290 J
PHENANTHRENE	20000	NA	NA	NA	NA	NA	200 J
PYRENE	22000	NA	NA	NA	NA	NA	830
TOTAL PAHS	125200	NA	NA	NA	NA	NA	5495
PESTICIDES/PCBS (UG/KG)							
TOTAL AROCLOR	900	NA	NA	NA	NA	NA	NA
METALS (MG/KG)							
ARSENIC	18.9	NA	NA	NA	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - (SO_NA)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 of 2

SAMPLE ID	TP14W-2	DSY-FDPB	DSY-FDPE	DSY-FDPN	DSY-FDPS	DSY-FDPW	DPSOIL04
LOCATION ID	DSY-TP-14	DSY-TP-25	DSY-TP-25	DSY-TP-25	DSY-TP-25	DSY-TP-25	DSY-TP-DPSOIL
SAMPLE DATE	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/99
TOP DEPTH							
BOTTOM DEPTH							
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM
BARIUM	71.7	NA	NA	NA	NA	NA	NA
CADMIUM	3.96	NA	NA	NA	NA	NA	NA
CHROMIUM	37.1	NA	NA	NA	NA	NA	NA
LEAD	334	NA	NA	NA	NA	NA	NA
SILVER	1.89	NA	NA	NA	NA	NA	NA
PETROLEUM HYDROCARBONS (MG/KG)							
TOTAL PETROLEUM HYDROCARBONS	260	6.7	8.2	13	15	10	100

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 1 of 63

SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW02-2426	DSY-S-MW02-3436	DSY-S-MW03-0810	DSY-S-MW03-1618	DSY-S-MW04-0810	DSY-S-MW04-1618	DSY-S-MW04-3234	DSY-S-MW05-1012	DSY-S-MW05-2224	DSY-S-MW05-3234	DSY-S-MW05-4446	DSY-S-MW06-0406
LOCATION ID	DSY-MW-02	DSY-MW-02	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-04	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
1,1,2,2-TETRACHLOROETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
1,1,2-TRICHLOROETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
1,1-DICHLOROETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
1,1-DICHLOROETHENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
1,2-DICHLOROETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
1,2-DICHLOROPROPANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
2-BUTANONE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
2-HEXANONE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
4-METHYL-2-PENTANONE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
ACETONE	12 U	11 U	12 U	29 U	11 U	12 U	14 U	11 U	33 U	18 U	14 U	13 U	11 U
BENZENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
BROMODICHLOROMETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
BROMOFORM	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
BROMOMETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CARBON DISULFIDE	2 J	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CARBON TETRACHLORIDE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CHLOROBENZENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CHLORODIBROMOMETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CHLOROETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 UJ	12 UJ	11 UJ
CHLOROFORM	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
CHLOROMETHANE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW02-2426	DSY-S-MW02-3436	DSY-S-MW03-0810	DSY-S-MW03-1618	DSY-S-MW04-0810	DSY-S-MW04-1618	DSY-S-MW04-3234	DSY-S-MW05-1012	DSY-S-MW05-2224	DSY-S-MW05-3234	DSY-S-MW05-4446	DSY-S-MW06-0406
LOCATION ID	DSY-MW-02	DSY-MW-02	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-04	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
ETHYLBENZENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
METHYLENE CHLORIDE	12 U	17 U	18 U	13 U	11 U	18 U	22 U	19 U	12 U	17 U	17 U	34 U	22 U
STYRENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TETRACHLOROETHENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TOLUENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TOTAL 1,2-DICHLOROETHENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TOTAL XYLENES	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TRANS-1,3-DICHLOROPROPENE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
TRICHLOROETHENE	12 U	11 U	12 U	1 J	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
VINYL CHLORIDE	12 U	11 U	12 U	13 U	11 U	12 U	14 U	11 U	11 U	13 U	11 U	12 U	11 U
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
1,2-DICHLOROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
1,3-DICHLOROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
1,4-DICHLOROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2,2'-OXYBIS(1-CHLOROPROPANE)	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2,4,5-TRICHLOROPHENOL	1100 U	920 U	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
2,4,6-TRICHLOROPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2,4-DICHLOROPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2,4-DIMETHYLPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW02-2426	DSY-S-MW02-3436	DSY-S-MW03-0810	DSY-S-MW03-1618	DSY-S-MW04-0810	DSY-S-MW04-1618	DSY-S-MW04-3234	DSY-S-MW05-1012	DSY-S-MW05-2224	DSY-S-MW05-3234	DSY-S-MW05-4446	DSY-S-MW06-0406
LOCATION ID	DSY-MW-02	DSY-MW-02	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-04	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	920 UJ	950 U	990 UJ	890 UJ	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
2,4-DINITROTOLUENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2,6-DINITROTOLUENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2-CHLORONAPHTHALENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2-CHLOROPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2-METHYLNAPHTHALENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2-METHYLPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
2-NITROANILINE	1100 U	920 U	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
2-NITROPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
3,3'-DICHLOOROBENZIDINE	420 U	360 UJ	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 UJ	360 UJ	360 U
3-NITROANILINE	1100 U	920 UJ	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
4,6-DINITRO-2-METHYLPHENOL	1100 U	920 U	950 U	990 UJ	890 UJ	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
4-BROMOPHENYL PHENYL ETHER	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
4-CHLORO-3-METHYLPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
4-CHLOROANILINE	420 UJ	360 UJ	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
4-CHLOROPHENYL PHENYL ETHER	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
4-METHYLPHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
4-NITROANILINE	1100 U	920 UJ	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW02-2426	DSY-S-MW02-3436	DSY-S-MW03-0810	DSY-S-MW03-1618	DSY-S-MW04-0810	DSY-S-MW04-1618	DSY-S-MW04-3234	DSY-S-MW05-1012	DSY-S-MW05-2224	DSY-S-MW05-3234	DSY-S-MW05-4446	DSY-S-MW06-0406
LOCATION ID	DSY-MW-02	DSY-MW-02	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-04	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	920 U	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
ACENAPHTHENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
ACENAPHTHYLENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
ANTHRACENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BENZO(A)ANTHRACENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BENZO(A)PYRENE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BENZO(B)FLUORANTHENE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BENZO(G,H,I)PERYLENE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BENZO(K)FLUORANTHENE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BIS(2-CHLOROETHOXY)METHAN E	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BIS(2-CHLOROETHYL)ETHER	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BIS(2-ETHYLHEXYL)PHTHALATE	420 U	84 J	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
BUTYL BENZYL PHTHALATE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
CARBAZOLE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
CHRYSENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
DIBENZO(A,H)ANTHRACEN E	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
DIBENZOFURAN	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
DIETHYL PHTHALATE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
DIMETHYL PHTHALATE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW02-2426	DSY-S-MW02-3436	DSY-S-MW03-0810	DSY-S-MW03-1618	DSY-S-MW04-0810	DSY-S-MW04-1618	DSY-S-MW04-3234	DSY-S-MW05-1012	DSY-S-MW05-2224	DSY-S-MW05-3234	DSY-S-MW05-4446	DSY-S-MW06-0406
LOCATION ID	DSY-MW-02	DSY-MW-02	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-04	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	360 U	42 J	400 U	360 U	400 U	270 J	380 U	4000 UJ	360 U	340 U	360 U	360 U
DI-N-OCTYL PHTHALATE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
FLUORANTHENE	420 U	360 U	380 U	42 J	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
FLUORENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
HEXACHLOROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
HEXACHLOROBUTADIENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
HEXACHLOROCYCLOPENTADIENE	420 U	360 U	380 UJ	400 U	360 U	400 U	420 U	380 UJ	4000 UJ	360 U	340 U	360 U	360 U
HEXACHLOROETHANE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
HIGH MOLECULAR WEIGHT PAHS	420 U	360 U	380 U	83	360 U	400 U	420 U	380 U	4000 U	360 U	340 U	360 U	360 U
INDENO(1,2,3-CD)PYRENE	420 UJ	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
ISOPHORONE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
LOW MOLECULAR WEIGHT PAHS	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 U	360 U	340 U	360 U	360 U
NAPHTHALENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
NITROBENZENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
N-NITROSO-DI-N-PROPYLAMINE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
N-NITROSODIPHENYLAMINE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
PENTACHLOROPHENOL	1100 U	920 U	950 U	990 U	890 U	1000 U	1000 U	950 U	10000 UJ	910 U	850 U	910 U	910 U
PHENANTHRENE	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
PHENOL	420 U	360 U	380 U	400 U	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U
PYRENE	420 U	360 U	380 U	41 J	360 U	400 U	420 U	380 U	4000 UJ	360 U	340 U	360 U	360 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW02-2426	DSY-S-MW02-3436	DSY-S-MW03-0810	DSY-S-MW03-1618	DSY-S-MW04-0810	DSY-S-MW04-1618	DSY-S-MW04-3234	DSY-S-MW05-1012	DSY-S-MW05-2224	DSY-S-MW05-3234	DSY-S-MW05-4446	DSY-S-MW06-0406
LOCATION ID	DSY-MW-02	DSY-MW-02	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-04	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	360 U	380 U	83	360 U	400 U	420 U	380 U	4000 U	360 U	340 U	360 U	360 U
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0 R	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	0 R	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
4,4'-DDE	0 R	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	0 R	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
4,4'-DDT	4.3 U	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ALDRIN	2.2 U	1.9 U	1.9 U	2 U	1.8 U	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
ALPHA-BHC	2.2 U	1.9 U	1.9 U	2 U	1.8 U	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
ALPHA-CHLORDANE	0 R	1.9 U	1.9 U	2.1	1.8 U	2 U	0 R	1.9 UJ	2 U	1.9 U	1.7 U	1.9 U	1.9 U
AROCLOR-1016	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
AROCLOR-1221	85 U	74 U	76 U	80 U	72 U	79 U	83 U	75 U	79 U	72 U	68 U	72 U	73 U
AROCLOR-1232	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
AROCLOR-1242	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
AROCLOR-1248	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
AROCLOR-1254	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
AROCLOR-1260	43 U	37 U	38 U	39 U	36 U	39 U	42 U	38 U	40 U	36 U	34 U	36 U	36 U
BETA-BHC	2.2 U	1.9 U	1.9 U	2 U	1.8 U	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
DELTA-BHC	2.2 U	1.9 U	1.9 U	2 U	1.8 U	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
DIELDRIN	0 R	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	0 R	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ENDOSULFAN I	0 R	1.9 U	1.9 U	2 U	1.8 U	2 U	0 R	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
ENDOSULFAN II	0 R	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	0 R	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ENDOSULFAN SULFATE	4.3 U	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ENDRIN	0 R	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	0 R	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ENDRIN ALDEHYDE	4.3 U	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
ENDRIN KETONE	4.3 U	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW02-2426	DSY-S-MW02-3436	DSY-S-MW03-0810	DSY-S-MW03-1618	DSY-S-MW04-0810	DSY-S-MW04-1618	DSY-S-MW04-3234	DSY-S-MW05-1012	DSY-S-MW05-2224	DSY-S-MW05-3234	DSY-S-MW05-4446	DSY-S-MW06-0406
LOCATION ID	DSY-MW-02	DSY-MW-02	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-04	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	1.9 U	1.9 U	2 U	1.8 U	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
GAMMA-CHLORDANE	0 R	1.9 U	1.9 U	2.1	1.8 U	2 U	0 R	1.9 UJ	2 U	1.9 U	1.7 U	1.9 U	1.9 U
HEPTACHLOR	2.2 U	3.8	1.9 U	2 U	3.3	2 U	2.1 U	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
HEPTACHLOR EPOXIDE	0 R	1.9 U	1.9 U	2 U	1.8 U	2 U	0 R	1.9 U	2 U	1.9 U	1.7 U	1.9 U	1.9 U
METHOXYCHLOR	22 U	19 U	19 U	20 U	18 U	20 U	21 U	19 U	20 U	19 U	17 U	19 U	19 U
PCB-209	4.3 U	3.7 U	3.8 U	3.9 UJ	3.6 UJ	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
SUM OF PCB CONGENERS X 2	4.3 U	3.7 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	3.8 U	4 U	3.6 U	3.4 U	3.6 U	3.6 U
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	220 U	190 U	190 U	200 U	180 U	200 U	210 U	190 U	200 U	190 U	170 U	190 U	190 U
METALS (MG/KG)													
ALUMINUM	4890	7320	18200	4400 J	11100 J	2430	6000	10100	6490	4820	6840	6990	19900
ANTIMONY	11.8 UJ	11.7 UJ	11.6 UJ	12.6 U	11.3 U	11.9 UJ	12.2 UJ	11 UJ	11.4 UJ	9.3 UJ	11 UJ	11.3 UJ	17.6 UJ
ARSENIC	4.3	4	6.6	7	9.9	3	7.3	4.9	7.1 J	6.3 J	8	4.1 U	11.1
BARIUM	3.2	7.6	7.1	7.5	9	2.6 U	3.9	6.6	12.6 J	2.6 UJ	14.7	14.3	5.5 J
BERYLLIUM	0.23 U	0.23 U	0.33 J	0.24 U	0.23 J	0.23 U	0.23 U	0.21 U	0.3 J	0.18 UJ	0.22	0.23	0.34 U
CADMIUM	0.68 U	0.68 U	0.67 U	0.73 U	0.65 U	0.69 U	0.7 U	0.63 U	0.66 UJ	0.54 UJ	0.64 U	0.65 U	1 U
CALCIUM	3480	1140	2170	662	1210	852	1500	1430	1630	577	1380	1230	784
CHROMIUM	10.9 J	12.3	27.1 J	10.3	18.1	6 UJ	10.7 J	18.2 J	8.7 J	7.7 J	11.7 J	10.4 J	25.6 J
COBALT	5.2	7.1	19.8	6.7	15.4	2.6 U	5.9	9.6	7.3 J	3.9 J	10.2	6.7	24
COPPER	8.6	11.4	30.9	11.5 J	23.5	5 U	10.6	24.1	13.9 J	5.1 J	15	10	21.2
IRON	13500	18600	40600	15500 J	26800 J	7440	17000	24100	16100	14300	20500	14500	43600
LEAD	6 J	3.1 J	10 J	2.7	29.2	2.1 J	8.3 J	23.4 J	12.8 J	2.1 J	4.3 J	3.9 J	13.3 J
MAGNESIUM	1950	2980	7680	1660	3870	921	2170	4380	2570	1900	2890	2730	7130
MANGANESE	97.9	159 J	385	113	370	89.2	149	155	310 J	86.2 J	227	156	495

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW02-2426	DSY-S-MW02-3436	DSY-S-MW03-0810	DSY-S-MW03-1618	DSY-S-MW04-0810	DSY-S-MW04-1618	DSY-S-MW04-3234	DSY-S-MW05-1012	DSY-S-MW05-2224	DSY-S-MW05-3234	DSY-S-MW05-4446	DSY-S-MW06-0406
LOCATION ID	DSY-MW-02	DSY-MW-02	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-04	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	0.06 U	0.06 U	0.07	0.05 U	0.05 U	0.06 U	0.05 U	0.06 U	0.05 U	0.05 U	0.06 U	0.05 U
NICKEL	8.9	15.8 J	39.5	12 J	22.7 J	5.5	11.9	24.9	13.4 J	10.4 J	16.9	13.9	39.7
POTASSIUM	191	658	286	355	331	169	176	248	378	190	547	473	166
SELENIUM	0.91 UJ	1.2 J	1 J	0.97 U	0.87 U	0.92 UJ	0.94 UJ	1.1 J	0 R	0 R	0.85 U	0.87 U	0.68 U
SILVER	1.4 UJ	1.4 UJ	1.3 UJ	1.5 UJ	1.3 UJ	1.4 UJ	1.4 UJ	1.3 UJ	1.3 UJ	1.1 UJ	1.3 UJ	1.3 UJ	2 UJ
SODIUM	66.3 U	147 U	31.7 U	51.2 U	52.6 U	28.5 U	37.4 U	97.5 U	47 U	40.5 U	68.3 U	70.3 U	0 R
THALLIUM	1.4 U	1.4 UJ	1.3 U	1.5 UJ	1.3 UJ	1.4 U	1.4 U	1.3 U	0 R	0 R	1.3 UJ	1.3 UJ	1 UJ
VANADIUM	11	12.9	17.2 J	11	19.3 J	5.5	11.5	10.9 J	8.9	10.5	10.9	10.9	17.7
ZINC	37	35.4	71.3	30.8	52.8	13.7	37.9	50.1	31.9 J	31.3 J	37.9 J	31.1 J	72 J
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	49 U	49 U	49 U	49 U	50 U	49 U	49 U	50 U	49 U	50 U	50 U	50 U
MONOBUTYLTIN	50 U	49 U	49 U	49 U	49 U	50 U	49 U	49 UJ	50 U	49 U	50 U	50 U	50 U
TETRABUTYLTIN	50 U	49 U	49 U	49 U	49 U	50 U	49 U	49 UJ	50 U	49 U	50 U	50 U	50 U
TRIBUTYLTIN	2.2 J	49 U	1.4 J	49 U	2.9 J	50 U	49 U	49 U	4.9 J	49 U	50 U	50 U	50 U
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	76 U	79 UJ	66 U	100 U	91 U	73 U	89	72 U	4100	72 U	67 U	67 U	83
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	8.8	4 U	4 U	4 U	4 U
BARIUM	53.8	373	352	78.3 U	114 U	307	250	415	806 U	693 U	184 U	122 U	55 U
CADMIUM	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW02-2426	DSY-S-MW02-3436	DSY-S-MW03-0810	DSY-S-MW03-1618	DSY-S-MW04-0810	DSY-S-MW04-1618	DSY-S-MW04-3234	DSY-S-MW05-1012	DSY-S-MW05-2224	DSY-S-MW05-3234	DSY-S-MW05-4446	DSY-S-MW06-0406
LOCATION ID	DSY-MW-02	DSY-MW-02	DSY-MW-02	DSY-MW-03	DSY-MW-03	DSY-MW-04	DSY-MW-04	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-05	DSY-MW-06
SAMPLE DATE	08/08/96	08/08/96	08/09/96	08/05/96	08/05/96	08/12/96	08/12/96	08/13/96	08/21/96	08/21/96	08/23/96	08/23/96	08/30/96
TOP DEPTH	18 FT	24 FT	34 FT	8 FT	16 FT	8 FT	16 FT	32 FT	10 FT	22 FT	32 FT	44 FT	4 FT
BOTTOM DEPTH	20 FT	26 FT	36 FT	10 FT	18 FT	10 FT	18 FT	34 FT	12 FT	24 FT	34 FT	46 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	6 U	6 U	6 U	6 U	6 U	6 U	7.4 J	21.5	8.5 J	6 U	6 U	6 U
LEAD	24.7	1 U	48.8	1 U	1 U	1 U	45.4	12.2	23.5	2.4 U	3 UJ	1 U	5.1 UJ
MERCURY	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 UJ	0.1 U	0.1 U	0.1 U	0.1 U
SELENIUM	4 U	4 U	4 U	4 U	4 U	4 U	4 U	6.9 U	4 U	4 U	4 U	6.7 U	4 U
SILVER	6 U	6 U	6 U	6 UJ	6 UJ	7.5 UJ	6 U	7.8 UJ	6 UJ	6 UJ	6 U	6 U	8.6 UJ

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW07-0810	DSY-S-MW07-1618	DSY-S-MW07-1618-D	DSY-S-MW07-2224	DSY-S-MW07-3436	DSY-S-MW08-0810	DSY-S-MW09-1012	DSY-S-MW09-1012-D	DSY-S-MW09-2022	DSY-S-MW09-3032	DSY-S-MW09-3638	DSY-S-MW11-1113
LOCATION ID	DSY-MW-02	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
1,1,2,2-TETRACHLOROETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
1,1,2-TRICHLOROETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
1,1-DICHLOROETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
1,1-DICHLOROETHENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
1,2-DICHLOROPROPANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
2-BUTANONE	12 U	11 U	12 U	18 U	12 U	11 U	11 U	15 U	11 U	15 U	12 U	11 U	12 U
2-HEXANONE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
4-METHYL-2-PENTANONE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
ACETONE	12 U	25 U	39 U	45 U	23 U	11 U	11 U	10 U	11 U	20 U	13 U	11 U	150 U
BENZENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
BROMODICHLOROMETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
BROMOFORM	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
BROMOMETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
CARBON DISULFIDE	2 J	11 U	12 U	12 U	4 J	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
CARBON TETRACHLORIDE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
CHLOROBENZENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
CHLORODIBROMOMETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
CHLOROETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 UJ	10 UJ	11 UJ	11 UJ	12 UJ	11 UJ	12 U
CHLOROFORM	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
CHLOROMETHANE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW07-0810	DSY-S-MW07-1618	DSY-S-MW07-1618-D	DSY-S-MW07-2224	DSY-S-MW07-3436	DSY-S-MW08-0810	DSY-S-MW09-1012	DSY-S-MW09-1012-D	DSY-S-MW09-2022	DSY-S-MW09-3032	DSY-S-MW09-3638	DSY-S-MW11-1113
LOCATION ID	DSY-MW-02	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
ETHYLBENZENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
METHYLENE CHLORIDE	12 U	18 U	13 U	12 U	15 U	13 U	34 U	17 U	14 U	33 U	37 U	16 U	16 U
STYRENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
TETRACHLOROETHENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
TOLUENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
TOTAL 1,2-DICHLOROETHENE	12 U	11 U	12 U	12 U	12 U	11 U	3 J	10 U	1 J	11 U	12 U	11 U	12 U
TOTAL XYLENES	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 UJ	11 U	12 U
TRANS-1,3-DICHLOROPROPENE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
TRICHLOROETHENE	12 U	11 U	12 U	12 U	12 U	11 U	3 J	10 U	11 U	11 U	12 U	11 U	12 U
VINYL CHLORIDE	12 U	11 U	12 U	12 U	12 U	11 U	11 U	10 U	11 U	11 U	12 U	11 U	12 U
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
1,2-DICHLOROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
1,3-DICHLOROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
1,4-DICHLOROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2,2'-OXYBIS(1-CHLOROPROPANE)	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2,4,5-TRICHLOROPHENOL	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
2,4,6-TRICHLOROPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2,4-DICHLOROPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2,4-DIMETHYLPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U

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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW07-0810	DSY-S-MW07-1618	DSY-S-MW07-1618-D	DSY-S-MW07-2224	DSY-S-MW07-3436	DSY-S-MW08-0810	DSY-S-MW09-1012	DSY-S-MW09-1012-D	DSY-S-MW09-2022	DSY-S-MW09-3032	DSY-S-MW09-3638	DSY-S-MW11-1113
LOCATION ID	DSY-MW-02	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 UJ	910 U	890 U
2,4-DINITROTOLUENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2,6-DINITROTOLUENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2-CHLORONAPHTHALENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2-CHLOROPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2-METHYLNAPHTHALENE	420 U	280 J	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2-METHYLPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
2-NITROANILINE	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
2-NITROPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
3,3'-DICHLOOROBENZIDINE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 UJ	360 U	350 U
3-NITROANILINE	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
4,6-DINITRO-2-METHYLPHENOL	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
4-BROMOPHENYL PHENYL ETHER	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
4-CHLORO-3-METHYLPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
4-CHLOROANILINE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
4-CHLOROPHENYL PHENYL ETHER	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
4-METHYLPHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
4-NITROANILINE	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW07-0810	DSY-S-MW07-1618	DSY-S-MW07-1618-D	DSY-S-MW07-2224	DSY-S-MW07-3436	DSY-S-MW08-0810	DSY-S-MW09-1012	DSY-S-MW09-1012-D	DSY-S-MW09-2022	DSY-S-MW09-3032	DSY-S-MW09-3638	DSY-S-MW11-1113
LOCATION ID	DSY-MW-02	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
ACENAPHTHENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
ACENAPHTHYLENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
ANTHRACENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
BENZO(A)ANTHRACENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	53 J	70 J	370 UJ	380 U	360 U	350 U
BENZO(A)PYRENE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	41 J	42 J	370 UJ	380 U	360 U	350 U
BENZO(B)FLUORANTHENE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	63 J	390 UJ	370 UJ	380 U	360 U	350 U
BENZO(G,H,I)PERYLENE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
BENZO(K)FLUORANTHENE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
BIS(2-CHLOROETHOXY)METHAN E	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
BIS(2-CHLOROETHYL)ETHER	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
BIS(2-ETHYLHEXYL)PHTHALATE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	400 UJ	380 U	360 U	350 U
BUTYL BENZYL PHTHALATE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
CARBAZOLE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
CHRYSENE	420 U	370 UJ	51 J	390 UJ	380 UJ	380 UJ	340 UJ	54 J	41 J	370 UJ	380 U	360 U	350 U
DIBENZO(A,H)ANTHRACEN E	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
DIBENZOFURAN	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
DIETHYL PHTHALATE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
DIMETHYL PHTHALATE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW07-0810	DSY-S-MW07-1618	DSY-S-MW07-1618-D	DSY-S-MW07-2224	DSY-S-MW07-3436	DSY-S-MW08-0810	DSY-S-MW09-1012	DSY-S-MW09-1012-D	DSY-S-MW09-2022	DSY-S-MW09-3032	DSY-S-MW09-3638	DSY-S-MW11-1113
LOCATION ID	DSY-MW-02	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
DI-N-OCTYL PHTHALATE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
FLUORANTHENE	420 U	370 UJ	49 J	49 J	380 UJ	380 UJ	100 J	130 J	130 J	370 UJ	380 U	360 U	350 U
FLUORENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
HEXACHLOROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
HEXACHLOROBUTADIENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
HEXACHLOROCYCLOPENTADIENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
HEXACHLOROETHANE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
HIGH MOLECULAR WEIGHT PAHS	420 U	370 U	142	94	380 U	380 U	200	439	413	370 U	380 U	360 U	350 U
INDENO(1,2,3-CD)PYRENE	420 UJ	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
ISOPHORONE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
LOW MOLECULAR WEIGHT PAHS	420 U	377	360 U	390 U	380 U	380 U	51	81	74	370 U	380 U	360 U	350 U
NAPHTHALENE	420 U	49 J	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
NITROBENZENE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
N-NITROSO-DI-N-PROPYLAMINE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
N-NITROSODIPHENYLAMINE	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
PENTACHLOROPHENOL	1100 U	920 UJ	910 UJ	970 UJ	970 UJ	950 UJ	850 UJ	960 UJ	990 UJ	930 UJ	960 U	910 U	890 U
PHENANTHRENE	420 U	48 J	360 UJ	390 UJ	380 UJ	380 UJ	51 J	81 J	74 J	370 UJ	380 U	360 U	350 U
PHENOL	420 U	370 UJ	360 UJ	390 UJ	380 UJ	380 UJ	340 UJ	380 UJ	390 UJ	370 UJ	380 U	360 U	350 U
PYRENE	420 U	370 UJ	42 J	45 J	380 UJ	380 UJ	100 J	98 J	130 J	370 UJ	380 U	360 U	350 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW07-0810	DSY-S-MW07-1618	DSY-S-MW07-1618-D	DSY-S-MW07-2224	DSY-S-MW07-3436	DSY-S-MW08-0810	DSY-S-MW09-1012	DSY-S-MW09-1012-D	DSY-S-MW09-2022	DSY-S-MW09-3032	DSY-S-MW09-3638	DSY-S-MW11-1113
LOCATION ID	DSY-MW-02	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	377	142	94	380 U	380 U	251	520	487	370 U	380 U	360 U	350 U
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0 R	3.7 UJ	3.6 UJ	220 J	28 J	7.4 J	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
4,4'-DDE	0 R	3.7 UJ	3.6 UJ	11 J	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
4,4'-DDT	4.3 U	3.7 UJ	3.6 UJ	100 J	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
ALDRIN	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
ALPHA-BHC	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
ALPHA-CHLORDANE	0 R	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
AROCLOR-1016	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
AROCLOR-1221	85 U	73 UJ	73 UJ	76 UJ	76 UJ	75 UJ	68 UJ	76 UJ	78 UJ	74 UJ	76 U	72 U	73 U
AROCLOR-1232	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
AROCLOR-1242	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
AROCLOR-1248	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
AROCLOR-1254	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
AROCLOR-1260	43 U	37 UJ	36 UJ	38 UJ	38 UJ	38 UJ	34 UJ	38 UJ	39 UJ	37 UJ	38 U	36 U	36 U
BETA-BHC	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
DELTA-BHC	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
DIELDRIN	0 R	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
ENDOSULFAN I	0 R	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
ENDOSULFAN II	0 R	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
ENDOSULFAN SULFATE	4.3 U	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
ENDRIN	0 R	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
ENDRIN ALDEHYDE	4.3 U	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
ENDRIN KETONE	4.3 U	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW07-0810	DSY-S-MW07-1618	DSY-S-MW07-1618-D	DSY-S-MW07-2224	DSY-S-MW07-3436	DSY-S-MW08-0810	DSY-S-MW09-1012	DSY-S-MW09-1012-D	DSY-S-MW09-2022	DSY-S-MW09-3032	DSY-S-MW09-3638	DSY-S-MW11-1113
LOCATION ID	DSY-MW-02	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
GAMMA-CHLORDANE	0 R	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
HEPTACHLOR	2.2 U	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	2.4
HEPTACHLOR EPOXIDE	0 R	1.9 UJ	1.9 UJ	2 UJ	2 UJ	1.9 UJ	1.7 UJ	2 UJ	2 UJ	1.9 UJ	2 U	1.9 U	1.8 U
METHOXYCHLOR	22 U	19 UJ	19 UJ	20 UJ	20 UJ	19 UJ	17 UJ	20 UJ	20 UJ	19 UJ	20 U	19 U	18 U
PCB-209	4.3 U	3.7 UJ	3.6 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.4 UJ	3.8 UJ	3.9 UJ	3.7 UJ	3.8 U	3.6 U	3.6 U
SUM OF PCB CONGENERS X 2	4.3 U	3.7 U	3.6 U	3.8 U	3.8 U	3.8 U	3.4 U	3.8 U	3.9 U	3.7 U	3.8 U	3.6 U	3.6 U
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	220 U	190 UJ	190 UJ	200 UJ	200 UJ	190 UJ	170 UJ	200 UJ	200 UJ	190 UJ	200 U	190 U	180 U
METALS (MG/KG)													
ALUMINUM	4890	8890	10100	8820	5800	7350	11200	10400	6960	11100	16300	16700	6260 J
ANTIMONY	11.8 UJ	9.1 UJ	10.4 UJ	8.8 UJ	11.2 UJ	9.6 UJ	11.7 UJ	10.5 UJ	10.4 UJ	10.1 UJ	11 UJ	10.7 UJ	11.3 U
ARSENIC	4.3	20.3	20.9	18.4	5	3.9	20.7	17.8	19	9.8	9.7	4.4	3.3
BARIUM	3.2	17.2	15.7	13.2	4.1 U	13.2	9.3 J	10.5 J	9.3 J	17.7 J	3.1	4.7 J	15.1
BERYLLIUM	0.23 U	0.41 J	0.38 J	0.38 J	0.21 U	0.26 J	0.3	0.32	0.31	0.3	0.21 U	0.21	0.23 J
CADMIUM	0.68 U	0.52 U	0.6 U	0.51 U	0.64 U	0.55 U	0.67 U	0.61 U	0.6 U	0.58 U	0.64 U	0.62 U	0.65 U
CALCIUM	3480	374 J	830 J	776 J	596 J	1430 J	1190	1020	742	1900	1900	5190	437
CHROMIUM	10.9 J	10.5	12.3	11	8.2	10.3	16.1 J	16.3 J	10.6 J	16.5 J	21.6 J	20.8 J	7.8 U
COBALT	5.2	10.2	11.4	11.4	4.6	6.4	13.7	11.2	8.8	13	15.9	16.1	5.4
COPPER	8.6	17.3	17.4	17.5	5.9	11.4	23.9	23.2	18.6	16.2	30.9	41.5	14 J
IRON	13500	25200	28400	26200	15100	15100	30200	31000	28200	31800	36800	40400	12800 J
LEAD	6 J	7.6 J	37.1 J	35.1 J	2.6 J	4.5 J	17.3 J	24.2 J	23.8 J	6.8 J	17.8 J	3.1 J	6.6
MAGNESIUM	1950	2220	3040	2680	2210	2920	3650	3570	2200	4600	6830	8000	1600
MANGANESE	97.9	396	364	336	92.5	147	502	251	246	462	391	728	180

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW07-0810	DSY-S-MW07-1618	DSY-S-MW07-1618-D	DSY-S-MW07-2224	DSY-S-MW07-3436	DSY-S-MW08-0810	DSY-S-MW09-1012	DSY-S-MW09-1012-D	DSY-S-MW09-2022	DSY-S-MW09-3032	DSY-S-MW09-3638	DSY-S-MW11-1113
LOCATION ID	DSY-MW-02	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	0.07	0.05 U	0.15	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.05 U	0.05
NICKEL	8.9	18.8	20.7	20.1	11.5	13.9	24.5	20.9	17.2	25.3	32.5	33.2	11 J
POTASSIUM	191	289	224	179 U	309	566	227	342	265	593	108	145	274
SELENIUM	0.91 UJ	0.7 U	0.8 U	0.68 U	0.86 U	0.74 U	0.9 U	0.81 U	0.8 U	0.77 U	0.85 U	0.83 U	0.87 U
SILVER	1.4 UJ	1 UJ	1.2 UJ	1 UJ	1.3 UJ	1.1 UJ	1.3 UJ	1.2 UJ	1.2 UJ	1.2 UJ	1.3 UJ	1.2 UJ	1.3 UJ
SODIUM	66.3 U	21.4 UJ	46.7 U	34.8 U	43.5 U	228	55.4 UJ	57.5 UJ	68.8 UJ	68.2 UJ	17 U	0 R	54.5 U
THALLIUM	1.4 U	1 UJ	1.2 UJ	1 UJ	1.3 UJ	1.1 UJ	1.3 UJ	1.2 UJ	1.2 UJ	1.2 UJ	1.3 UJ	1.2 UJ	1.3 UJ
VANADIUM	11	13	13.7	11.7	12.3	11.5	13.1	17.5	11.7	15.2	13.4	12.3	8.4
ZINC	37	40.6 J	60.1 J	58.6 J	28 J	32.2 J	59 J	73 J	67.3 J	63.2 J	66.3 J	53.8 J	25.5
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	50 U	50 U	49 U	49 U	50 U	49 UJ	49 UJ	50 UJ	50 UJ	50 U	50 U	49 U
MONOBUTYLTIN	50 U	50 UJ	50 U	49 U	49 U	50 U	49 UJ	49 UJ	50 UJ	50 UJ	50 U	50 U	49 U
TETRABUTYLTIN	50 U	50 UJ	50 U	49 U	49 U	50 U	49 UJ	49 UJ	50 UJ	50 UJ	50 U	50 U	49 U
TRIBUTYLTIN	2.2 J	50 U	50 U	49 U	49 U	50 U	49 UJ	49 UJ	50 UJ	50 UJ	50 U	50 U	3.6 J
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	76 U	160	72 U	74 U	74 U	70 U	490	73 UJ	72 J	70 U	75 U	69 U	75 UJ
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	18.6	24.6	26.8	4.2 J	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
BARIUM	53.8	710 U	514 U	681 U	340 U	613 U	61.5 U	92.1 U	77.5 U	83.8 U	69.6 U	91.6 U	337 U
CADMIUM	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW07-0810	DSY-S-MW07-1618	DSY-S-MW07-1618-D	DSY-S-MW07-2224	DSY-S-MW07-3436	DSY-S-MW08-0810	DSY-S-MW09-1012	DSY-S-MW09-1012-D	DSY-S-MW09-2022	DSY-S-MW09-3032	DSY-S-MW09-3638	DSY-S-MW11-1113
LOCATION ID	DSY-MW-02	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-09	DSY-MW-11
SAMPLE DATE	08/08/96	08/14/96	08/14/96	08/14/96	08/14/96	08/15/96	08/27/96	08/28/96	08/28/96	08/28/96	08/29/96	08/29/96	08/01/96
TOP DEPTH	18 FT	8 FT	16 FT	16 FT	22 FT	34 FT	8 FT	10 FT	10 FT	20 FT	30 FT	36 FT	11 FT
BOTTOM DEPTH	20 FT	10 FT	18 FT	18 FT	24 FT	36 FT	10 FT	12 FT	12 FT	22 FT	32 FT	38 FT	13 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	7.3 J	6 U	6 U	6 U	14.6	6 U	6 U	6 U	6 U	6 U	6 U	6 U
LEAD	24.7	1.8 UJ	37.1 U	38.1 U	1.8 UJ	1 U	2.6 UJ	15.8 J	21.8 J	1.9 UJ	5.4 UJ	2.8 UJ	2.3 U
MERCURY	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SELENIUM	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
SILVER	6 U	6 U	6 U	6 U	6 U	8.1 UJ	6 U	6 U	6 U	6 U	6 U	6 U	6 UJ

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW11-1113-D	DSY-S-MW11-2729	DSY-S-MW11-0103	DSY-S-MW11-2931	DSY-S-MW11-2931-D	DSY-S-MW12-SS12	DSY-S-MW12-SS16	DSY-S-MW12-SS05	N1-0	N1-100	N1-150	N1-200
LOCATION ID	DSY-MW-02	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-12	DSY-MW-12	DSY-MW-12	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,1-DICHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,1-DICHLOROETHENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,2-DICHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
1,2-DICHLOROPROPANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
2-BUTANONE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
2-HEXANONE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
4-METHYL-2-PENTANONE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
ACETONE	12 U	110 U	77 U	75 U	240	270 U	11 U	11 U	11 U	7 B	52 B	26 B	24 B
BENZENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
BROMODICHLOROMETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
BROMOFORM	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
BROMOMETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CARBON DISULFIDE	2 J	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CARBON TETRACHLORIDE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CHLOROBENZENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CHLORODIBROMOMETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CHLOROETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CHLOROFORM	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
CHLOROMETHANE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW11-1113-D	DSY-S-MW11-2729	DSY-S-MW11-0103	DSY-S-MW11-2931	DSY-S-MW11-2931-D	DSY-S-MW12-SS12	DSY-S-MW12-SS16	DSY-S-MW12-SS05	N1-0	N1-100	N1-150	N1-200
LOCATION ID	DSY-MW-02	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-12	DSY-MW-12	DSY-MW-12	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
ETHYLBENZENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
METHYLENE CHLORIDE	12 U	22 U	21 U	18 U	23 U	36 U	16 U	13 U	14 U	NA	NA	NA	NA
STYRENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
TETRACHLOROETHENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
TOLUENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
TOTAL 1,2-DICHLOROETHENE	12 U	12 U	13 U	11 U	1 J	5 J	11 U	11 U	11 U	NA	NA	NA	NA
TOTAL XYLENES	12 U	12 U	13 U	2 J	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
TRICHLOROETHENE	12 U	12 U	2 J	11 U	4 J	4 J	11 U	11 U	11 U	NA	NA	NA	NA
VINYL CHLORIDE	12 U	12 U	13 U	11 U	13 U	23 U	11 U	11 U	11 U	NA	NA	NA	NA
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
1,2-DICHLOROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
1,3-DICHLOROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
1,4-DICHLOROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 U	890 U	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2,4-DICHLOROPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW11-1113-D	DSY-S-MW11-2729	DSY-S-MW11-0103	DSY-S-MW11-2931	DSY-S-MW11-2931-D	DSY-S-MW12-SS12	DSY-S-MW12-SS16	DSY-S-MW12-SS05	N1-0	N1-100	N1-150	N1-200
LOCATION ID	DSY-MW-02	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-12	DSY-MW-12	DSY-MW-12	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	890 UJ	940 U	880 U	960 UJ	900 UJ	0 R	960 U	890 U	NA	NA	NA	NA
2,4-DINITROTOLUENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2,6-DINITROTOLUENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2-CHLORONAPHTHALENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2-CHLOROPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2-METHYLNAPHTHALENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2-METHYLPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
2-NITROANILINE	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 U	890 U	NA	NA	NA	NA
2-NITROPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	420 U	350 U	370 U	350 U	380 U	360 U	330 UJ	380 UJ	350 UJ	NA	NA	NA	NA
3-NITROANILINE	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 U	890 U	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	1100 U	890 U	940 U	880 U	960 U	900 UJ	0 R	960 U	890 U	NA	NA	NA	NA
4-BROMOPHENYL PHENYL ETHER	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
4-CHLOROANILINE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
4-CHLOROPHENYL PHENYL ETHER	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
4-METHYLPHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
4-NITROANILINE	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 UJ	890 UJ	NA	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW11-1113-D	DSY-S-MW11-2729	DSY-S-MW11-0103	DSY-S-MW11-2931	DSY-S-MW11-2931-D	DSY-S-MW12-SS12	DSY-S-MW12-SS16	DSY-S-MW12-SS05	N1-0	N1-100	N1-150	N1-200
LOCATION ID	DSY-MW-02	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-12	DSY-MW-12	DSY-MW-12	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 U	890 U	NA	NA	NA	NA
ACENAPHTHENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
ACENAPHTHYLENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
ANTHRACENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	48 J	NA	NA
BENZO(A)ANTHRACENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	140 J	64 J	NA
BENZO(A)PYRENE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	140 J	54 J	NA
BENZO(B)FLUORANTHENE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	170 J	63 J	NA
BENZO(G,H,I)PERYLENE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	56 J	NA	NA
BENZO(K)FLUORANTHENE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	84 J	42 J	NA
BIS(2-CHLOROETHOXY)METHAN E	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	57 J	44 J	NA	53 J	39 J	NA
BUTYL BENZYL PHTHALATE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
CARBAZOLE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
CHRYSENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	170 J	82 J	NA
DIBENZO(A,H)ANTHRACEN E	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
DIBENZOFURAN	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
DIETHYL PHTHALATE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
DIMETHYL PHTHALATE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW11-1113-D	DSY-S-MW11-2729	DSY-S-MW11-0103	DSY-S-MW11-2931	DSY-S-MW11-2931-D	DSY-S-MW12-SS12	DSY-S-MW12-SS16	DSY-S-MW12-SS05	N1-0	N1-100	N1-150	N1-200
LOCATION ID	DSY-MW-02	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-12	DSY-MW-12	DSY-MW-12	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
DI-N-OCTYL PHTHALATE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
FLUORANTHENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	41 J	290 J	81 J	NA
FLUORENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
HEXACHLOROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
HEXACHLOROBUTADIENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
HEXACHLOROETHANE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
HIGH MOLECULAR WEIGHT PAHS	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	1376	457	NA
INDENO(1,2,3-CD)PYRENE	420 UJ	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	66 J	NA	NA
ISOPHORONE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
LOW MOLECULAR WEIGHT PAHS	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	1	NA	NA	NA
NAPHTHALENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	1 J	NA	NA	NA
NITROBENZENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
PENTACHLOROPHENOL	1100 U	890 U	940 U	880 U	960 U	900 U	840 U	960 U	890 U	NA	NA	NA	NA
PHENANTHRENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	190 J	NA	NA
PHENOL	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	NA	NA	NA	NA
PYRENE	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	34 J	260 J	71 J	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW11-1113-D	DSY-S-MW11-2729	DSY-S-MW11-0103	DSY-S-MW11-2931	DSY-S-MW11-2931-D	DSY-S-MW12-SS12	DSY-S-MW12-SS16	DSY-S-MW12-SS05	N1-0	N1-100	N1-150	N1-200
LOCATION ID	DSY-MW-02	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-12	DSY-MW-12	DSY-MW-12	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	350 U	370 U	350 U	380 U	360 U	330 U	380 U	350 U	76	1614	457	NA
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0 R	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
4,4'-DDE	0 R	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
4,4'-DDT	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ALDRIN	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
ALPHA-BHC	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
ALPHA-CHLORDANE	0 R	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
AROCLOR-1016	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
AROCLOR-1221	85 U	72 U	76 U	71 U	79 U	73 U	68 U	76 U	70 U	NA	NA	NA	NA
AROCLOR-1232	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
AROCLOR-1242	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
AROCLOR-1248	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
AROCLOR-1254	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
AROCLOR-1260	43 U	35 U	38 U	35 U	39 U	36 U	34 U	38 U	35 U	NA	NA	NA	NA
BETA-BHC	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
DELTA-BHC	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
DIELDRIN	0 R	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ENDOSULFAN I	0 R	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
ENDOSULFAN II	0 R	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ENDOSULFAN SULFATE	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ENDRIN	0 R	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ENDRIN ALDEHYDE	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
ENDRIN KETONE	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW11-1113-D	DSY-S-MW11-2729	DSY-S-MW11-0103	DSY-S-MW11-2931	DSY-S-MW11-2931-D	DSY-S-MW12-SS12	DSY-S-MW12-SS16	DSY-S-MW12-SS05	N1-0	N1-100	N1-150	N1-200
LOCATION ID	DSY-MW-02	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-12	DSY-MW-12	DSY-MW-12	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
GAMMA-CHLORDANE	0 R	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
HEPTACHLOR	2.2 U	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	0 R	1.8 U	1.9 U	1.8 U	2 U	1.8 U	1.7 U	2 U	1.8 U	NA	NA	NA	NA
METHOXYCHLOR	22 U	18 U	19 U	18 U	20 U	18 U	17 U	20 U	18 U	NA	NA	NA	NA
PCB-209	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
SUM OF PCB CONGENERS X 2	4.3 U	3.5 U	3.8 U	3.5 U	3.9 U	3.6 U	3.4 U	3.8 U	3.5 U	NA	NA	NA	NA
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	58 P	NA	NA
TOXAPHENE	220 U	180 U	190 U	180 U	200 U	180 U	170 U	200 U	180 U	NA	NA	NA	NA
METALS (MG/KG)													
ALUMINUM	4890	5950 J	7540 J	6570 J	17900 J	15100 J	7770	17200	3840	NA	NA	NA	NA
ANTIMONY	11.8 UJ	10.5 U	11 U	11.2 U	11.2 U	11.7 U	9.8 UJ	9 UJ	11.5 UJ	NA	NA	NA	NA
ARSENIC	4.3	3.1	14.6	3.7	14.7	13.3	5.6	7.6	4.3	10	15	18	20
BARIUM	3.2	13.6	8.6	24.7	3.7	3.7	13	5.5	3.5 U	23	35	29	26
BERYLLIUM	0.23 U	0.27 J	0.24 J	0.32 J	0.27 J	0.26 J	0.28 J	0.23 J	0.22 U	NA	NA	NA	NA
CADMIUM	0.68 U	0.61 U	0.63 U	0.65 U	0.65 U	0.67 U	0.57 U	0.52 U	0.66 U	2.8	1.5	1.7	2
CALCIUM	3480	377	569	581	2520	2110	734	1770	688	NA	NA	NA	NA
CHROMIUM	10.9 J	9.8	18.3	10	24.6	23	14.2	23	6.5 J	22	12	14	15
COBALT	5.2	4.9	10.2	8.5	11.7	10.6	9.7	12.7	4.5	NA	NA	NA	NA
COPPER	8.6	16.6	19.3	15.5 J	23.6	28.7	17.2	25.1	7.9	NA	NA	NA	NA
IRON	13500	14900 J	32000 J	14200 J	44400 J	38200 J	18600	43100	12000	NA	NA	NA	NA
LEAD	6 J	6.2	3.6	7.4	11.8	9.6	4 J	5.7 J	1.7 UJ	14	20	14	11
MAGNESIUM	1950	1590	2570	2430	6850	5760	3260	6350	1470	NA	NA	NA	NA
MANGANESE	97.9	181	203	376	334	280	274 J	382 J	97.5 J	NA	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW11-1113-D	DSY-S-MW11-2729	DSY-S-MW11-0103	DSY-S-MW11-2931	DSY-S-MW11-2931-D	DSY-S-MW12-SS12	DSY-S-MW12-SS16	DSY-S-MW12-SS05	N1-0	N1-100	N1-150	N1-200
LOCATION ID	DSY-MW-02	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-12	DSY-MW-12	DSY-MW-12	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	0.05 U	0.05 U	0.05 U	0.31	0.15	0.05 U	0.16 U	0.05 U	NA	NA	NA	NA
NICKEL	8.9	10.3 J	18.6 J	12.6 J	33.9	29.5	18.3 J	31.2 J	9.4 J	NA	NA	NA	NA
POTASSIUM	191	275	269	711	161	180	1190	151	199	NA	NA	NA	NA
SELENIUM	0.91 UJ	0.81 U	0.84 U	0.86 U	0.86 U	0.9 U	0.79 J	1.3 J	0.89 UJ	NA	NA	NA	NA
SILVER	1.4 UJ	1.2 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.1 UJ	1 UJ	1.3 UJ	5	NA	NA	3
SODIUM	66.3 U	46.8 U	50.4 U	55.1 U	42.9 U	47 U	72.6 U	104 U	30 U	NA	NA	NA	NA
THALLIUM	1.4 U	1.2 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.1 UJ	1 UJ	1.3 UJ	NA	NA	NA	NA
VANADIUM	11	8.5	14.9 J	9.7	23.9 J	18.8 J	13	17.4	6.4	NA	NA	NA	NA
ZINC	37	29	49.6	32.7	74.9	59.7	37.3	73.4 J	22	NA	NA	NA	NA
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	49 U	50 U	50 UJ	50 U	49 U	50 U	49 U	49 U	NA	NA	NA	NA
MONOBUTYLTIN	50 U	49 U	50 U	50 UJ	50 U	49 U	50 U	49 U	49 U	NA	NA	NA	NA
TETRABUTYLTIN	50 U	49 U	50 U	50 UJ	50 U	49 U	50 U	49 U	4.6 J	NA	NA	NA	NA
TRIBUTYLTIN	2.2 J	49 U	50 U	50 UJ	15.1 J	49 UJ	50 U	49 U	49 U	NA	NA	NA	NA
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	76 U	91 UJ	85 UJ	50 UJ	95 UJ	92 UJ	74 U	94 UJ	87 U	NA	NA	NA	NA
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	NA	NA	NA	NA
BARIUM	53.8	460 U	78.8 U	73.3 U	72.9 U	87 U	605	421	330	NA	NA	NA	NA
CADMIUM	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-MW11-1113-D	DSY-S-MW11-2729	DSY-S-MW11-0103	DSY-S-MW11-2931	DSY-S-MW11-2931-D	DSY-S-MW12-SS12	DSY-S-MW12-SS16	DSY-S-MW12-SS05	N1-0	N1-100	N1-150	N1-200
LOCATION ID	DSY-MW-02	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-11	DSY-MW-12	DSY-MW-12	DSY-MW-12	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	08/01/96	08/01/96	07/31/96	08/01/96	08/01/96	08/06/96	08/07/96	08/06/96	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	11 FT	27 FT	1 FT	29 FT	29 FT	21 FT	29 FT	7 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	13 FT	29 FT	3 FT	31 FT	31 FT	23 FT	31 FT	9 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	NA	NA	NA	NA
LEAD	24.7	1.8 U	1 U	1 U	1.5 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA
MERCURY	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	NA	NA	NA	NA
SELENIUM	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	NA	NA	NA	NA
SILVER	6 U	6 UJ	6 UJ	11 UJ	6 UJ	6 UJ	6 U	6 U	6 U	NA	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	N1-250	N1-50	N1-A	N1-B	N1-C	N1-D	N1-E	S1	S42 BOT	S42 SWE	S42 SWN	S42 SWS
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-BUTANONE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-HEXANONE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ACETONE	12 U	110 B	18 B	23 B	22 B	15 B	14 B	13 B	55 B	20 B	42 B	35 B	61 B
BENZENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BROMOFORM	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BROMOMETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	2 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROBENZENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLORODIBROMOMETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROFORM	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROMETHANE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	N1-250	N1-50	N1-A	N1-B	N1-C	N1-D	N1-E	S1	S42 BOT	S42 SWE	S42 SWN	S42 SWS
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ETHYLBENZENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	12 U	NA	NA	1 JB	NA	NA	NA	1 JB	NA	NA	NA	1 JB	NA
STYRENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TETRACHLOROETHENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOLUENE	12 U	NA	0.9 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL 1,2-DICHLOROETHENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL XYLENES	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 J	NA
TRANS-1,3-DICHLOROPROPENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VINYL CHLORIDE	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	420 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	N1-250	N1-50	N1-A	N1-B	N1-C	N1-D	N1-E	S1	S42 BOT	S42 SWE	S42 SWN	S42 SWS
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROTOLUENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-CHLOROPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-METHYLPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-NITROANILINE	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-NITROPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-DICHLOOROBENZIDINE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-NITROANILINE	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-BROMOPHENYL PHENYL ETHER	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLOROANILINE	420 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLOROPHENYL PHENYL ETHER	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-METHYLPHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-NITROANILINE	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	N1-250	N1-50	N1-A	N1-B	N1-C	N1-D	N1-E	S1	S42 BOT	S42 SWE	S42 SWN	S42 SWS
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	420 U	NA	46 J	NA	270 J	NA	NA	NA	NA	NA	NA	41 J	NA
ACENAPHTHYLENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	43 J	NA
ANTHRACENE	420 U	82 J	64 J	NA	490	NA	NA	NA	NA	NA	NA	120 J	NA
BENZO(A)ANTHRACENE	420 U	280 J	120 J	NA	1300	NA	NA	NA	NA	NA	NA	360	75 J
BENZO(A)PYRENE	420 UJ	230 J	98 J	NA	690	NA	NA	NA	NA	NA	NA	370	49 J
BENZO(B)FLUORANTHENE	420 UJ	300 J	140 J	NA	910	NA	NA	NA	NA	NA	NA	470	71 J
BENZO(G,H,I)PERYLENE	420 UJ	120 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	250 J	NA
BENZO(K)FLUORANTHENE	420 UJ	180 J	60 J	NA	350	NA	NA	NA	NA	NA	NA	150	NA
BIS(2-CHLOROETHOXY)METHAN E	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	420 U	64 J	NA	NA	NA	NA	NA	NA	44 J	NA	NA	NA	NA
BUTYL BENZYL PHTHALATE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CARBAZOLE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	420 U	350	140 J	NA	1300	NA	NA	NA	NA	NA	NA	460	90 J
DIBENZO(A,H)ANTHRACEN E	420 UJ	46 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIBENZOFURAN	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIETHYL PHTHALATE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIMETHYL PHTHALATE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	N1-250	N1-50	N1-A	N1-B	N1-C	N1-D	N1-E	S1	S42 BOT	S42 SWE	S42 SWN	S42 SWS
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DI-N-OCTYL PHTHALATE	420 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	420 U	580	300 J	44 J	4400	NA	NA	41 J	44 J	NA	NA	830	150 J
FLUORENE	420 U	NA	86 J	NA	730	NA	NA	NA	NA	NA	NA	44 J	NA
HEXACHLOROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROETHANE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HIGH MOLECULAR WEIGHT PAHS	420 U	2656	1150	NA	11950	NA	NA	NA	NA	NA	NA	3850	545
INDENO(1,2,3-CD)PYRENE	420 UJ	140 J	62 J	NA	NA	NA	NA	NA	NA	NA	NA	240 J	NA
ISOPHORONE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LOW MOLECULAR WEIGHT PAHS	420 U	NA	486	NA	6690	NA	NA	NA	NA	NA	NA	718	NA
NAPHTHALENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NITROBENZENE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	1100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	420 U	330	290 J	NA	5200	NA	NA	37 J	NA	NA	NA	470	130 J
PHENOL	420 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PYRENE	420 U	430	230 J	38 J	3000	NA	NA	36 J	39 J	NA	NA	720	110 J

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	N1-250	N1-50	N1-A	N1-B	N1-C	N1-D	N1-E	S1	S42 BOT	S42 SWE	S42 SWN	S42 SWS
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	3068	1636	82	18640	NA	NA	114	83	NA	NA	4568	675
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ALDRIN	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ALPHA-BHC	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1016	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221	85 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260	43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BETA-BHC	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DELTA-BHC	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIELDRIN	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE
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FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	N1-250	N1-50	N1-A	N1-B	N1-C	N1-D	N1-E	S1	S42 BOT	S42 SWE	S42 SWN	S42 SWS
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	0 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	22 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-209	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SUM OF PCB CONGENERS X 2	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100	NA
TOXAPHENE	220 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METALS (MG/KG)													
ALUMINUM	4890	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ANTIMONY	11.8 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	4.3	11	17	19	27	20	16	21	25	16	21	22	21
BARIUM	3.2	24	29	28	24	20	23	23	28	28	22	37	25
BERYLLIUM	0.23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	0.68 U	1.7	1.6	1.7	1.9	1.9	1.9	2.4	2.1	1.7	1.9	2	1.9
CALCIUM	3480	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	10.9 J	13	12	12	13	14	13	16	14	13	13	15	13
COBALT	5.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
COPPER	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
IRON	13500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	6 J	14	16	13	12	11	12	45	15	15	10	26	17
MAGNESIUM	1950	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	97.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	N1-250	N1-50	N1-A	N1-B	N1-C	N1-D	N1-E	S1	S42 BOT	S42 SWE	S42 SWN	S42 SWS
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NICKEL	8.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POTASSIUM	191	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SELENIUM	0.91 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	1.4 UJ	NA	NA	NA	3	3	3	4	3	NA	3	NA	NA
SODIUM	66.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
THALLIUM	1.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VANADIUM	11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ZINC	37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MONOBUTYLTIN	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TETRABUTYLTIN	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIBUTYLTIN	2.2 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	76 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PETROLEUM HYDROCARBONS	NA	NA	31	15	21	NA	NA	NA	NA	NA	NA	130	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	53.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	N1-250	N1-50	N1-A	N1-B	N1-C	N1-D	N1-E	S1	S42 BOT	S42 SWE	S42 SWN	S42 SWS
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5	DSY-S-42-5
SAMPLE DATE	08/08/96	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00	01/01/00
TOP DEPTH	18 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
BOTTOM DEPTH	20 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT	8 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	24.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MERCURY	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SELENIUM	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	6 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	S42 SWW	DSY-SB-01-0911	DSY-SB-03-0911	DSY-SB-04-0406	DSY-SB-06-0204	DSY-SB-09-1416	DSY-SB-10-1416	DSY-SB-14-0103	DSY-SB-14-0103-D	DSY-SB-15-0103	DSY-S-TP01-1112	DSY-S-TP02-1516
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-SB-01	DSY-SB-03	DSY-SB-04	DSY-SB-06	DSY-SB-09	DSY-SB-10	DSY-SB-14	DSY-SB-14	DSY-SB-15	DSY-TP-01	DSY-TP-02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,1,2,2-TETRACHLOROETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,1,2-TRICHLOROETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,1-DICHLOROETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,1-DICHLOROETHENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,2-DICHLOROETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
1,2-DICHLOROPROPANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
2-BUTANONE	12 U	NA	11 U	11 U	12 U	12 U	12 U	17 U	11 U	11 U	11 U	11 U	NA
2-HEXANONE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
4-METHYL-2-PENTANONE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
ACETONE	12 U	41 B	16 U	14 U	19 U	27 U	50 U	65 U	15 U	14 U	16 U	15 U	NA
BENZENE	12 U	NA	11 U	11 U	12 U	1 J	12 U	12 U	11 U	11 U	11 U	11 U	NA
BROMODICHLOROMETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
BROMOFORM	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
BROMOMETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CARBON DISULFIDE	2 J	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CARBON TETRACHLORIDE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CHLOROBENZENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CHLORODIBROMOMETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CHLOROETHANE	12 U	NA	11 UJ	11 UJ	12 UJ	12 UJ	12 UJ	12 UJ	11 UJ	11 UJ	11 UJ	11 U	NA
CHLOROFORM	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
CHLOROMETHANE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	S42 SWW	DSY-SB-01-0911	DSY-SB-03-0911	DSY-SB-04-0406	DSY-SB-06-0204	DSY-SB-09-1416	DSY-SB-10-1416	DSY-SB-14-0103	DSY-SB-14-0103-D	DSY-SB-15-0103	DSY-S-TP01-1112	DSY-S-TP02-1516
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-SB-01	DSY-SB-03	DSY-SB-04	DSY-SB-06	DSY-SB-09	DSY-SB-10	DSY-SB-14	DSY-SB-14	DSY-SB-15	DSY-TP-01	DSY-TP-02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
ETHYLBENZENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
METHYLENE CHLORIDE	12 U	NA	22 U	19 U	16 U	20 U	22 U	23 U	11 U	11 U	11 U	13 U	NA
STYRENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
TETRACHLOROETHENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
TOLUENE	12 U	10 J	11 U	11 U	12 U	1 J	1 J	12 U	11 U	11 U	11 U	11 U	NA
TOTAL 1,2-DICHLOROETHENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
TOTAL XYLENES	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
TRANS-1,3-DICHLOROPROPENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
TRICHLOROETHENE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
VINYL CHLORIDE	12 U	NA	11 U	11 U	12 U	12 U	12 U	12 U	11 U	11 U	11 U	11 U	NA
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
1,2-DICHLOROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
1,3-DICHLOROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
1,4-DICHLOROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	420 UJ	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2,4,5-TRICHLOROPHENOL	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
2,4,6-TRICHLOROPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2,4-DICHLOROPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2,4-DIMETHYLPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO, SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	S42 SWW	DSY-SB-01-0911	DSY-SB-03-0911	DSY-SB-04-0406	DSY-SB-06-0204	DSY-SB-09-1416	DSY-SB-10-1416	DSY-SB-14-0103	DSY-SB-14-0103-D	DSY-SB-15-0103	DSY-S-TP01-1112	DSY-S-TP02-1516
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-SB-01	DSY-SB-03	DSY-SB-04	DSY-SB-06	DSY-SB-09	DSY-SB-10	DSY-SB-14	DSY-SB-14	DSY-SB-15	DSY-TP-01	DSY-TP-02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
2,4-DINITROTOLUENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2,6-DINITROTOLUENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2-CHLORONAPHTHALENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2-CHLOROPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2-METHYLNAPHTHALENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	50 J	400 U	66 J	360 UJ	NA
2-METHYLPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
2-NITROANILINE	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
2-NITROPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
3,3'-DICHLOROBENZIDINE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
3-NITROANILINE	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
4,6-DINITRO-2-METHYLPHENOL	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
4-BROMOPHENYL PHENYL ETHER	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
4-CHLORO-3-METHYLPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
4-CHLOROANILINE	420 UJ	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
4-CHLOROPHENYL PHENYL ETHER	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
4-METHYLPHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
4-NITROANILINE	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	S42 SWW	DSY-SB-01-0911	DSY-SB-03-0911	DSY-SB-04-0406	DSY-SB-06-0204	DSY-SB-09-1416	DSY-SB-10-1416	DSY-SB-14-0103	DSY-SB-14-0103-D	DSY-SB-15-0103	DSY-S-TP01-1112	DSY-S-TP02-1516
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-SB-01	DSY-SB-03	DSY-SB-04	DSY-SB-06	DSY-SB-09	DSY-SB-10	DSY-SB-14	DSY-SB-14	DSY-SB-15	DSY-TP-01	DSY-TP-02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
ACENAPHTHENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
ACENAPHTHYLENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
ANTHRACENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BENZO(A)ANTHRACENE	420 U	NA	530 U	510 U	490 U	440 U	84 J	480 UJ	67 J	400 U	400 U	360 UJ	NA
BENZO(A)PYRENE	420 UJ	NA	74 J	510 U	490 U	440 U	73 J	480 UJ	58 J	400 U	400 UJ	360 UJ	NA
BENZO(B)FLUORANTHENE	420 UJ	NA	81 J	510 U	490 U	440 U	130 J	480 UJ	100 J	400 U	400 UJ	43 J	NA
BENZO(G,H,I)PERYLENE	420 UJ	NA	61 J	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BENZO(K)FLUORANTHENE	420 UJ	NA	530 U	510 U	490 U	440 U	65 J	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BIS(2-CHLOROETHOXY)METHAN E	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BIS(2-CHLOROETHYL)ETHER	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BIS(2-ETHYLHEXYL)PHTHALATE	420 U	NA	530 U	510 U	800 U	440 U	430 U	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
BUTYL BENZYL PHTHALATE	420 U	NA	530 U	510 U	490 U	440 U	48 J	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
CARBAZOLE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
CHRYSENE	420 U	NA	530 U	510 U	490 U	440 U	88 J	480 UJ	62 J	400 U	110 J	360 UJ	NA
DIBENZO(A,H)ANTHRACEN E	420 UJ	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
DIBENZOFURAN	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
DIETHYL PHTHALATE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
DIMETHYL PHTHALATE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	S42 SWW	DSY-SB-01-0911	DSY-SB-03-0911	DSY-SB-04-0406	DSY-SB-06-0204	DSY-SB-09-1416	DSY-SB-10-1416	DSY-SB-14-0103	DSY-SB-14-0103-D	DSY-SB-15-0103	DSY-S-TP01-1112	DSY-S-TP02-1516
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-SB-01	DSY-SB-03	DSY-SB-04	DSY-SB-06	DSY-SB-09	DSY-SB-10	DSY-SB-14	DSY-SB-14	DSY-SB-15	DSY-TP-01	DSY-TP-02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	NA	530 U	510 U	50 J	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
DI-N-OCTYL PHTHALATE	420 UJ	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
FLUORANTHENE	420 U	NA	530 U	510 U	490 U	440 U	130 J	480 UJ	130 J	56 J	110 J	59 J	NA
FLUORENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
HEXACHLOROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
HEXACHLOROBUTADIENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
HEXACHLOROCYCLOPENTADIENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
HEXACHLOROETHANE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
HIGH MOLECULAR WEIGHT PAHS	420 U	NA	216	510 U	490 U	440 U	740	480 U	567	99	320	169	NA
INDENO(1,2,3-CD)PYRENE	420 UJ	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
ISOPHORONE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
LOW MOLECULAR WEIGHT PAHS	420 U	NA	530 U	510 U	490 U	440 U	120	480 U	160	400 U	226	360 U	NA
NAPHTHALENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
NITROBENZENE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
N-NITROSO-DI-N-PROPYLAMINE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
N-NITROSODIPHENYLAMINE	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
PENTACHLOROPHENOL	1100 U	NA	1300 U	1300 U	1200 U	1100 U	1100 UJ	1200 UJ	1100 U	1000 U	1000 UJ	900 UJ	NA
PHENANTHRENE	420 U	NA	530 U	510 U	490 U	440 U	120 J	480 UJ	110 J	400 U	160 J	360 UJ	NA
PHENOL	420 U	NA	530 U	510 U	490 U	440 U	430 UJ	480 UJ	450 U	400 U	400 UJ	360 UJ	NA
PYRENE	420 U	NA	530 U	510 U	490 U	440 U	170 J	480 UJ	150 J	43 J	100 J	67 J	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO, SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-SB-01	DSY-SB-03	DSY-SB-04	DSY-SB-06	DSY-SB-09	DSY-SB-10	DSY-SB-14	DSY-SB-14	DSY-SB-15	DSY-TP-01	DSY-TP-02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	NA	216	510 U	490 U	440 U	860	480 U	727	99	546	169	NA
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0 R	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
4,4'-DDE	0 R	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
4,4'-DDT	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ALDRIN	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
ALPHA-BHC	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
ALPHA-CHLORDANE	0 R	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
AROCLOR-1016	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
AROCLOR-1221	85 U	NA	110 U	100 U	98 U	88 U	86 U	96 U	90 U	81 U	81 U	72 U	NA
AROCLOR-1232	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
AROCLOR-1242	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
AROCLOR-1248	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
AROCLOR-1254	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
AROCLOR-1260	43 U	NA	53 U	51 U	49 U	44 U	43 U	48 U	45 U	40 U	40 U	36 U	NA
BETA-BHC	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
DELTA-BHC	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
DIELDRIN	0 R	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ENDOSULFAN I	0 R	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
ENDOSULFAN II	0 R	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ENDOSULFAN SULFATE	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ENDRIN	0 R	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ENDRIN ALDEHYDE	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
ENDRIN KETONE	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	S42 SWW	DSY-SB-01-0911	DSY-SB-03-0911	DSY-SB-04-0406	DSY-SB-06-0204	DSY-SB-09-1416	DSY-SB-10-1416	DSY-SB-14-0103	DSY-SB-14-0103-D	DSY-SB-15-0103	DSY-S-TP01-1112	DSY-S-TP02-1516
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-SB-01	DSY-SB-03	DSY-SB-04	DSY-SB-06	DSY-SB-09	DSY-SB-10	DSY-SB-14	DSY-SB-14	DSY-SB-15	DSY-TP-01	DSY-TP-02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
GAMMA-CHLORDANE	0 R	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
HEPTACHLOR	2.2 U	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
HEPTACHLOR EPOXIDE	0 R	NA	2.7 U	2.6 U	2.5 U	2.3 U	2.2 U	2.5 U	2.3 U	2.1 U	2.1 U	1.9 U	NA
METHOXYCHLOR	22 U	NA	27 U	26 U	25 U	23 U	22 U	25 U	23 U	21 U	21 U	19 U	NA
PCB-209	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
SUM OF PCB CONGENERS X 2	4.3 U	NA	5.3 U	5.1 U	4.9 U	4.4 U	4.3 U	4.8 U	4.5 U	4 U	4 U	3.6 U	NA
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	220 U	NA	270 U	260 U	250 U	230 U	220 U	250 U	230 U	210 U	210 U	190 U	NA
METALS (MG/KG)													
ALUMINUM	4890	NA	11100	10400	3270	3990	9530	13000	10500	10400	10700	5860	7450
ANTIMONY	11.8 UJ	NA	10.3 UJ	11.8 UJ	11 UJ	12 UJ	11.4 UJ	12.6 UJ	10.5 UJ	10.9 UJ	11.6 UJ	10.9 UJ	9.4 UJ
ARSENIC	4.3	15	24	17	3.5 U	7.7	15.7	17.8	17.7	17.9	16.1	7.7 J	7.8 J
BARIUM	3.2	34	8.3	6.3	4	6.6	19.4	20.2	20.7	21.1	10.1	2.9 UJ	18 J
BERYLLIUM	0.23 U	NA	0.25 J	0.23 U	0.21 U	0.23 U	0.45 J	0.52	0.44	0.46	0.32 J	0.21 UJ	0.34 J
CADMIUM	0.68 U	1.7	1 J	0.72 J	0.63 UJ	0.69 UJ	0.66 UJ	1.1 J	0.61 UJ	1 J	0.97 J	0.63 UJ	0.54 UJ
CALCIUM	3480	NA	750 J	874 J	658 J	585 J	3630 J	929 J	1000 J	1250 J	1170 J	1140	3490
CHROMIUM	10.9 J	12	15.9	13.6	8.1	60.2	13.1	18.4	14.3	13.2	14.5	6.6 J	10.9 J
COBALT	5.2	NA	14.7	11.8	3.9 U	6.3	12	12.1	10.8	9.6	12.8	4.4 J	9.1 J
COPPER	8.6	NA	16.2	16.1	4.1	38.8	18.5	12.4	20.7	14.3	19.9	7 J	21.2 J
IRON	13500	NA	36000	32300	9520	29200	25700	31100	24200	24400	28400	16800	19700
LEAD	6 J	16	12.5 J	15.5 J	1.5 J	1.3 UJ	16.1 J	8.2 J	12.5 J	29.5 J	5.3 J	7.6 J	34.2 J
MAGNESIUM	1950	NA	4000	3760	1270	1500	2610	3470	2750	2730	3450	2230	2380
MANGANESE	97.9	NA	551 J	451 J	93.2 J	236 J	366 J	311 J	352 J	302 J	289 J	104 J	353 J

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	S42 SWW	DSY-SB-01-0911	DSY-SB-03-0911	DSY-SB-04-0406	DSY-SB-06-0204	DSY-SB-09-1416	DSY-SB-10-1416	DSY-SB-14-0103	DSY-SB-14-0103-D	DSY-SB-15-0103	DSY-S-TP01-1112	DSY-S-TP02-1516
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-SB-01	DSY-SB-03	DSY-SB-04	DSY-SB-06	DSY-SB-09	DSY-SB-10	DSY-SB-14	DSY-SB-14	DSY-SB-15	DSY-TP-01	DSY-TP-02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	NA	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.04 U	0.05 U	0.05 U	0.06 U
NICKEL	8.9	NA	21.2	21.2	7.2 U	30.1	18	24.7	16.6	16.9	21.9	10.7 J	18.9 J
POTASSIUM	191	NA	346	221	221	190	424	402	513	658	287	121	337
SELENIUM	0.91 UJ	NA	0.8 UJ	0.91 UJ	0.84 UJ	0.92 UJ	0.88 UJ	0.97 UJ	0.81 UJ	0.84 UJ	0.89 UJ	0 R	0 R
SILVER	1.4 UJ	3	1.2 UJ	1.4 UJ	1.3 UJ	1.4 UJ	1.3 UJ	1.4 UJ	1.2 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.1 UJ
SODIUM	66.3 U	NA	74.8 U	143 U	28.9 U	27.7 U	74.1 U	60.7 U	56.6 U	58.3 U	36.7 U	36.7 U	103 UJ
THALLIUM	1.4 U	NA	1.2 UJ	1.4 UJ	1.3 UJ	1.4 UJ	1.3 UJ	1.4 UJ	1.2 UJ	1.3 UJ	1.3 UJ	0 R	0 R
VANADIUM	11	NA	19.4 J	17.6 J	7	10.7 J	17.5 J	22.8 J	15.8 J	15.8 J	14 J	9	13.9
ZINC	37	NA	64	82.5	18	49.9	50.9	50.1	54.7	48.2	43.6	52.5 J	74.8 J
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	NA	49 U	49 U	49 U	50 U	49 U	50 U	50 U	50 U	49 U	50 U	NA
MONOBUTYLTIN	50 U	NA	49 U	49 U	49 U	50 U	49 U	50 U	50 U	50 U	49 U	50 U	NA
TETRABUTYLTIN	50 U	NA	49 U	49 U	49 U	50 U	49 U	50 U	50 U	50 U	49 U	50 U	NA
TRIBUTYLTIN	2.2 J	NA	49 U	49 U	49 U	50 U	49 U	50 U	50 U	50 U	49 U	50 U	NA
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	76 U	NA	110 U	100 U	93 U	86 U	17000	87 U	91 U	82 U	74 U	72	NA
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	NA	4 U	4 U	4 U	4 U	13.5	24.6	4 U	4.3 J	6.2 J	4 U	NA
BARIUM	53.8	NA	75 U	103 U	78.5 U	123 U	186 U	158 U	113 U	115 U	149 U	508 U	NA
CADMIUM	3 U	NA	3 U	3 U	3 U	21.5 UJ	3 U	6.6 UJ	3.5 UJ	7.8 UJ	8.5 UJ	3 U	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	S42 SWW	DSY-SB-01-0911	DSY-SB-03-0911	DSY-SB-04-0406	DSY-SB-06-0204	DSY-SB-09-1416	DSY-SB-10-1416	DSY-SB-14-0103	DSY-SB-14-0103-D	DSY-SB-15-0103	DSY-S-TP01-1112	DSY-S-TP02-1516
LOCATION ID	DSY-MW-02	DSY-S-42-5	DSY-SB-01	DSY-SB-03	DSY-SB-04	DSY-SB-06	DSY-SB-09	DSY-SB-10	DSY-SB-14	DSY-SB-14	DSY-SB-15	DSY-TP-01	DSY-TP-02
SAMPLE DATE	08/08/96	01/01/00	09/03/96	09/03/96	09/04/96	09/04/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	08/22/96	08/22/96
TOP DEPTH	18 FT	8 FT	9 FT	9 FT	4 FT	2 FT	14 FT	14 FT	1 FT	1 FT	1 FT	11 FT	15 FT
BOTTOM DEPTH	20 FT	8 FT	11 FT	11 FT	6 FT	4 FT	16 FT	16 FT	3 FT	3 FT	3 FT	12 FT	16 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	NA	6 U	18.2 UJ	7.4 UJ	129	13.4 UJ	29.5 J	6 U	7.6 UJ	6 U	6 U	NA
LEAD	24.7	NA	9.6 U	14.1 U	1.3 UJ	1 U	7.8 U	4.2 U	3.1 U	5.3 U	6.1 U	2.9 U	NA
MERCURY	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA
SELENIUM	4 U	NA	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4.3 UJ	NA
SILVER	6 U	NA	13.7 UJ	7.5 UJ	9 UJ	10.6 UJ	11.8 UJ	20.4 UJ	10.2 UJ	7.2 UJ	11.9 UJ	15.4 UJ	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP05-1213	DSY-S-TP06-1213	DSY-S-TP08-0910	DSY-S-TP08-0406	DSY-S-TP09-0910	DSY-S-TP09-0406	DSY-S-TP10-1213	DSY-S-TP10-0507	DSY-S-TP11-1213	DSY-S-TP11-0507	DSY-S-TP13-1011	DSY-S-TP13-0506
LOCATION ID	DSY-MW-02	DSY-TP-05	DSY-TP-06	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-09	DSY-TP-10	DSY-TP-10	DSY-TP-11	DSY-TP-11	DSY-TP-13	DSY-TP-13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,1,2,2-TETRACHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,1,2-TRICHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,1-DICHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,1-DICHLOROETHENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,2-DICHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
1,2-DICHLOROPROPANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
2-BUTANONE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	22 U
2-HEXANONE	12 U	NA	NA	12 UJ	10 UJ	NA	NA	NA	NA	12 U	NA	NA	12 UJ
4-METHYL-2-PENTANONE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 UJ
ACETONE	12 U	NA	NA	15 U	10 U	NA	NA	NA	NA	23 U	NA	NA	110 U
BENZENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
BROMODICHLOROMETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
BROMOFORM	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
BROMOMETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CARBON DISULFIDE	2 J	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CARBON TETRACHLORIDE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CHLOROBENZENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CHLORODIBROMOMETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CHLOROETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CHLOROFORM	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
CHLOROMETHANE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP05-1213	DSY-S-TP06-1213	DSY-S-TP08-0910	DSY-S-TP08-0406	DSY-S-TP09-0910	DSY-S-TP09-0406	DSY-S-TP10-1213	DSY-S-TP10-0507	DSY-S-TP11-1213	DSY-S-TP11-0507	DSY-S-TP13-1011	DSY-S-TP13-0506
LOCATION ID	DSY-MW-02	DSY-TP-05	DSY-TP-06	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-09	DSY-TP-10	DSY-TP-10	DSY-TP-11	DSY-TP-11	DSY-TP-13	DSY-TP-13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
ETHYLBENZENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
METHYLENE CHLORIDE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
STYRENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
TETRACHLOROETHENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
TOLUENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
TOTAL 1,2-DICHLOROETHENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
TOTAL XYLENES	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
TRANS-1,3-DICHLOROPROPENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
TRICHLOROETHENE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
VINYL CHLORIDE	12 U	NA	NA	12 U	10 U	NA	NA	NA	NA	12 U	NA	NA	12 U
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
1,2-DICHLOROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
1,3-DICHLOROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
1,4-DICHLOROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2,2'-OXYBIS(1-CHLOROPROPANE)	420 UJ	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2,4,5-TRICHLOROPHENOL	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U
2,4,6-TRICHLOROPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
2,4-DICHLOROPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2,4-DIMETHYLPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP05-1213	DSY-S-TP06-1213	DSY-S-TP08-0910	DSY-S-TP08-0406	DSY-S-TP09-0910	DSY-S-TP09-0406	DSY-S-TP10-1213	DSY-S-TP10-0507	DSY-S-TP11-1213	DSY-S-TP11-0507	DSY-S-TP13-1011	DSY-S-TP13-0506
LOCATION ID	DSY-MW-02	DSY-TP-05	DSY-TP-06	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-09	DSY-TP-10	DSY-TP-10	DSY-TP-11	DSY-TP-11	DSY-TP-13	DSY-TP-13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	NA	NA	9100 U	870 UJ	NA	NA	NA	NA	970 UJ	NA	NA	990 UJ
2,4-DINITROTOLUENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
2,6-DINITROTOLUENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
2-CHLORONAPHTHALENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
2-CHLOROPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2-METHYLNAPHTHALENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2-METHYLPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
2-NITROANILINE	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U
2-NITROPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
3,3'-DICHLOROBENZIDINE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
3-NITROANILINE	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U
4,6-DINITRO-2-METHYLPHENOL	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U
4-BROMOPHENYL PHENYL ETHER	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
4-CHLORO-3-METHYLPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
4-CHLOROANILINE	420 UJ	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
4-CHLOROPHENYL PHENYL ETHER	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
4-METHYLPHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
4-NITROANILINE	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP05-1213	DSY-S-TP06-1213	DSY-S-TP08-0910	DSY-S-TP08-0406	DSY-S-TP09-0910	DSY-S-TP09-0406	DSY-S-TP10-1213	DSY-S-TP10-0507	DSY-S-TP11-1213	DSY-S-TP11-0507	DSY-S-TP13-1011	DSY-S-TP13-0506
LOCATION ID	DSY-MW-02	DSY-TP-05	DSY-TP-06	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-09	DSY-TP-10	DSY-TP-10	DSY-TP-11	DSY-TP-11	DSY-TP-13	DSY-TP-13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 UJ
ACENAPHTHENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
ACENAPHTHYLENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
ANTHRACENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
BENZO(A)ANTHRACENE	420 U	NA	NA	3600 U	48 J	NA	NA	NA	NA	390 UJ	NA	NA	390 U
BENZO(A)PYRENE	420 UJ	NA	NA	3600 U	55 J	NA	NA	NA	NA	390 U	NA	NA	390 U
BENZO(B)FLUORANTHENE	420 UJ	NA	NA	3600 U	80 J	NA	NA	NA	NA	390 U	NA	NA	390 U
BENZO(G,H,I)PERYLENE	420 UJ	NA	NA	3600 U	45 J	NA	NA	NA	NA	390 U	NA	NA	390 U
BENZO(K)FLUORANTHENE	420 UJ	NA	NA	3600 U	68 J	NA	NA	NA	NA	390 U	NA	NA	390 U
BIS(2-CHLOROETHOXY)METHAN E	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
BIS(2-CHLOROETHYL)ETHER	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	420 U	NA	NA	22000	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
BUTYL BENZYL PHTHALATE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
CARBAZOLE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
CHRYSENE	420 U	NA	NA	3600 U	54 J	NA	NA	NA	NA	390 UJ	NA	NA	390 U
DIBENZO(A,H)ANTHRACEN E	420 UJ	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 U	NA	NA	390 U
DIBENZOFURAN	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
DIETHYL PHTHALATE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
DIMETHYL PHTHALATE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP05-1213	DSY-S-TP06-1213	DSY-S-TP08-0910	DSY-S-TP08-0406	DSY-S-TP09-0910	DSY-S-TP09-0406	DSY-S-TP10-1213	DSY-S-TP10-0507	DSY-S-TP11-1213	DSY-S-TP11-0507	DSY-S-TP13-1011	DSY-S-TP13-0506
LOCATION ID	DSY-MW-02	DSY-TP-05	DSY-TP-06	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-09	DSY-TP-10	DSY-TP-10	DSY-TP-11	DSY-TP-11	DSY-TP-13	DSY-TP-13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
DI-N-OCTYL PHTHALATE	420 UJ	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 U	NA	NA	390 U
FLUORANTHENE	420 U	NA	NA	3600 U	120 J	NA	NA	NA	NA	390 UJ	NA	NA	390 U
FLUORENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
HEXACHLOROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
HEXACHLOROBUTADIENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
HEXACHLOROCYCLOPENTADIENE	420 U	NA	NA	3600 U	350 UJ	NA	NA	NA	NA	390 UJ	NA	NA	390 U
HEXACHLOROETHANE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
HIGH MOLECULAR WEIGHT PAHS	420 U	NA	NA	3600 U	598	NA	NA	NA	NA	390 U	NA	NA	390 U
INDENO(1,2,3-CD)PYRENE	420 UJ	NA	NA	3600 U	41 J	NA	NA	NA	NA	390 U	NA	NA	390 U
ISOPHORONE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
LOW MOLECULAR WEIGHT PAHS	420 U	NA	NA	3600 U	57	NA	NA	NA	NA	390 U	NA	NA	390 U
NAPHTHALENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
NITROBENZENE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
N-NITROSO-DI-N-PROPYLAMINE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
N-NITROSODIPHENYLAMINE	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 U
PENTACHLOROPHENOL	1100 U	NA	NA	9100 U	870 U	NA	NA	NA	NA	970 UJ	NA	NA	990 U
PHENANTHRENE	420 U	NA	NA	3600 U	57 J	NA	NA	NA	NA	390 UJ	NA	NA	390 U
PHENOL	420 U	NA	NA	3600 U	350 U	NA	NA	NA	NA	390 UJ	NA	NA	390 UJ
PYRENE	420 U	NA	NA	3600 U	87 J	NA	NA	NA	NA	390 UJ	NA	NA	390 U

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP05-1213	DSY-S-TP06-1213	DSY-S-TP08-0910	DSY-S-TP08-0406	DSY-S-TP09-0910	DSY-S-TP09-0406	DSY-S-TP10-1213	DSY-S-TP10-0507	DSY-S-TP11-1213	DSY-S-TP11-0507	DSY-S-TP13-1011	DSY-S-TP13-0506
LOCATION ID	DSY-MW-02	DSY-TP-05	DSY-TP-06	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-09	DSY-TP-10	DSY-TP-10	DSY-TP-11	DSY-TP-11	DSY-TP-13	DSY-TP-13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	NA	NA	3600 U	655	NA	NA	NA	NA	390 U	NA	NA	390 U
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0 R	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
4,4'-DDE	0 R	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
4,4'-DDT	4.3 U	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
ALDRIN	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
ALPHA-BHC	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
ALPHA-CHLORDANE	0 R	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
AROCLOR-1016	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1221	85 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1232	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1242	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1248	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1254	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
AROCLOR-1260	43 U	NA	NA	36 UJ	35 U	NA	NA	NA	NA	39 U	NA	NA	39 U
BETA-BHC	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
DELTA-BHC	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
DIELDRIN	0 R	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
ENDOSULFAN I	0 R	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
ENDOSULFAN II	0 R	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
ENDOSULFAN SULFATE	4.3 U	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
ENDRIN	0 R	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	5.5	NA	NA	3.9 U
ENDRIN ALDEHYDE	4.3 U	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
ENDRIN KETONE	4.3 U	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP05-1213	DSY-S-TP06-1213	DSY-S-TP08-0910	DSY-S-TP08-0406	DSY-S-TP09-0910	DSY-S-TP09-0406	DSY-S-TP10-1213	DSY-S-TP10-0507	DSY-S-TP11-1213	DSY-S-TP11-0507	DSY-S-TP13-1011	DSY-S-TP13-0506
LOCATION ID	DSY-MW-02	DSY-TP-05	DSY-TP-06	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-09	DSY-TP-10	DSY-TP-10	DSY-TP-11	DSY-TP-11	DSY-TP-13	DSY-TP-13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
GAMMA-CHLORDANE	0 R	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
HEPTACHLOR	2.2 U	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
HEPTACHLOR EPOXIDE	0 R	NA	NA	1.9 UJ	1.8 U	NA	NA	NA	NA	2 U	NA	NA	2 U
METHOXYCHLOR	22 U	NA	NA	19 UJ	18 U	NA	NA	NA	NA	20 U	NA	NA	20 U
PCB-209	4.3 U	NA	NA	3.6 UJ	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
SUM OF PCB CONGENERS X 2	4.3 U	NA	NA	3.6 U	3.5 U	NA	NA	NA	NA	3.9 U	NA	NA	3.9 U
TOTAL AROCLOR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	220 U	NA	NA	190 UJ	180 U	NA	NA	NA	NA	200 U	NA	NA	200 U
METALS (MG/KG)													
ALUMINUM	4890	12100	13400	4900	7660	23300	17100	10000	3610	12600	9950	9310	11000
ANTIMONY	11.8 UJ	9 UJ	8.7 UJ	8.9 UJ	9.1 UJ	9.1 UJ	9.8 UJ	11 UJ	8.9 UJ	9.6 UJ	11.5 UJ	14 UJ	8.9 UJ
ARSENIC	4.3	23.2	21.6	3.2	8.7	15.9	11.7	17.3	3	36.9	22	15.7	16.1
BARIUM	3.2	13.9	14.3 J	7.2	18.4	16	13.2	17.3	5.4	17.5	15.9	14.5	23.4
BERYLLIUM	0.23 U	0.38 J	0.39 J	0.2 J	0.67	0.46	0.37 J	0.27 J	0.17 U	0.48	0.53	0.54	0.4 J
CADMIUM	0.68 U	0.52 U	0.56 J	0.51 U	0.53 U	0.52 U	0.57 U	0.66 J	0.52 U	1.2 J	1.1 UJ	0.97 UJ	0.7 J
CALCIUM	3480	1230	812	634	917	758	907	322	504	421	363	1880	478
CHROMIUM	10.9 J	15	16.5	9.3	18.2	32.5	22.5	13	6.2 J	17.8	8.9	9.6	13.3
COBALT	5.2	29.9	16.3	4.1	9.9	25	14	11.3	3.1	20.2 J	11.4	9	10 J
COPPER	8.6	18.9	23.6	9.5	46.1	39	22.1	18	6	27.4	18.1	15.8	11
IRON	13500	30800	34100	13000	22300	50000	36200	25100	10600	40100	25800	26000	25400
LEAD	6 J	10.6 J	15.8 J	7.1 J	67.2 J	34.6 J	12.9 J	7.7 J	4.1 J	11.3	8.5 J	24.1	11.8
MAGNESIUM	1950	3790	3820	1970	2560	8600	5900	2670	1330	3730	2420	2660	2460
MANGANESE	97.9	800	512	150	305	2450	398	344	78.6	612 J	323	373	529 J

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP05-1213	DSY-S-TP06-1213	DSY-S-TP08-0910	DSY-S-TP08-0406	DSY-S-TP09-0910	DSY-S-TP09-0406	DSY-S-TP10-1213	DSY-S-TP10-0507	DSY-S-TP11-1213	DSY-S-TP11-0507	DSY-S-TP13-1011	DSY-S-TP13-0506
LOCATION ID	DSY-MW-02	DSY-TP-05	DSY-TP-06	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-09	DSY-TP-10	DSY-TP-10	DSY-TP-11	DSY-TP-11	DSY-TP-13	DSY-TP-13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.08 U	0.05 U	0.07	0.11 U
NICKEL	8.9	30.9	24.1 J	10.2 J	31.6	48.1	27.7	19.7 J	8.9 J	33.1	20.1	14.4	15
POTASSIUM	191	365	224	306	417	225	250	373	216	340	259	219	205
SELENIUM	0.91 UJ	0.7 U	0.67 U	0.68 U	0.7 U	0.7 U	1.4 J	0.85 U	0.69 U	0.83 J	0.89 U	1.1 U	1.4
SILVER	1.4 UJ	1 UJ	1 UJ	1 UJ	1.1 UJ	1.6 J	1.1 UJ	1.3 UJ	1 UJ	1.1 U	1.3 U	1.6 U	1 U
SODIUM	66.3 U	23 J	9 J	353	47.9 J	16.3 J	14.5 J	34.5 J	17.6 J	42.5 U	52.7 UJ	69.9 UJ	82.8
THALLIUM	1.4 U	1 U	1 U	1 U	1.1 U	1 U	1.1 U	1.3 U	1 U	1.1 UJ	1.3 U	1.6 U	1 UJ
VANADIUM	11	17 J	18.3 J	8.4 J	13.5 J	19.5 J	19.6 J	15.9 J	7.5 J	18.5 J	16.8 J	16.2	17.8 J
ZINC	37	59.3	57	31.4	158	84.6	58.3	44	21.2	65.1	41.9	47.9	38.9
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	NA	NA	50 U	50 U	NA	NA	NA	NA	49 U	NA	NA	50 U
MONOBUTYLTIN	50 U	NA	NA	50 U	50 U	NA	NA	NA	NA	49 U	NA	NA	50 U
TETRABUTYLTIN	50 U	NA	NA	2.9 J	50 U	NA	NA	NA	NA	49 U	NA	NA	27 J
TRIBUTYLTIN	2.2 J	NA	NA	50 U	50 U	NA	NA	NA	NA	49 U	NA	NA	50 U
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	76 U	NA	NA	53 U	53 U	NA	NA	NA	NA	52 U	NA	NA	56 U
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	NA	NA	4 U	4 U	NA	NA	NA	NA	67.2	NA	NA	22.6 U
BARIUM	53.8	NA	NA	69.9	128	NA	NA	NA	NA	366	NA	NA	143 U
CADMIUM	3 U	NA	NA	3 U	3 U	NA	NA	NA	NA	3 U	NA	NA	3 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP05-1213	DSY-S-TP06-1213	DSY-S-TP08-0910	DSY-S-TP08-0406	DSY-S-TP09-0910	DSY-S-TP09-0406	DSY-S-TP10-1213	DSY-S-TP10-0507	DSY-S-TP11-1213	DSY-S-TP11-0507	DSY-S-TP13-1011	DSY-S-TP13-0506
LOCATION ID	DSY-MW-02	DSY-TP-05	DSY-TP-06	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-09	DSY-TP-10	DSY-TP-10	DSY-TP-11	DSY-TP-11	DSY-TP-13	DSY-TP-13
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	07/26/96	07/26/96	07/26/96
TOP DEPTH	18 FT	12 FT	12 FT	9 FT	4 FT	9 FT	4 FT	12 FT	5 FT	12 FT	5 FT	10 FT	5 FT
BOTTOM DEPTH	20 FT	13 FT	13 FT	10 FT	6 FT	10 FT	6 FT	13 FT	7 FT	13 FT	7 FT	11 FT	6 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	NA	NA	6 U	6 U	NA	NA	NA	NA	13.3 UJ	NA	NA	6.3 UJ
LEAD	24.7	NA	NA	3.4 U	4.8 U	NA	NA	NA	NA	56.2	NA	NA	5.5
MERCURY	0.1 U	NA	NA	0.54 UJ	0.42 UJ	NA	NA	NA	NA	0.13 UJ	NA	NA	0.1 UJ
SELENIUM	4 U	NA	NA	6.3 U	6.3 U	NA	NA	NA	NA	18	NA	NA	4 U
SILVER	6 U	NA	NA	6 U	6 U	NA	NA	NA	NA	36.4 UJ	NA	NA	0 R

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP13-0506-D	B6-S6	DSY-S-TP24-1011	DSY-S-TP24-0102	DSY-S-TP24-0102-D	DSY-S-TP24-0507	DSY-S-TP25-1011	DSY-S-TP25-0507	DPSOIL02
LOCATION ID	DSY-MW-02	DSY-TP-13	DSY-TP-14	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-25	DSY-TP-25	DSY-TP-DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)										
1,1,1-TRICHLOROETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
1,1,2,2-TETRACHLOROETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
1,1,2-TRICHLOROETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
1,1-DICHLOROETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
1,1-DICHLOROETHENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
1,2-DICHLOROETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
1,2-DICHLOROPROPANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
2-BUTANONE	12 U	22 U	NA	NA	14	11 U	NA	12 U	NA	NA
2-HEXANONE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
4-METHYL-2-PENTANONE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
ACETONE	12 U	87 U	NA	NA	99 J	33 J	NA	18 U	NA	NA
BENZENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
BROMODICHLOROMETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
BROMOFORM	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
BROMOMETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CARBON DISULFIDE	2 J	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CARBON TETRACHLORIDE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CHLOROBENZENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CHLORODIBROMOMETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CHLOROETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CHLOROFORM	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
CHLOROMETHANE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP13-0506-D	B6-S6	DSY-S-TP24-1011	DSY-S-TP24-0102	DSY-S-TP24-0102-D	DSY-S-TP24-0507	DSY-S-TP25-1011	DSY-S-TP25-0507	DPSOIL02
LOCATION ID	DSY-MW-02	DSY-TP-13	DSY-TP-14	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-25	DSY-TP-25	DSY-TP-DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
ETHYLBENZENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
METHYLENE CHLORIDE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
STYRENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
TETRACHLOROETHENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
TOLUENE	12 U	12 U	NA	NA	2 J	11 U	NA	12 U	NA	NA
TOTAL 1,2-DICHLOROETHENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
TOTAL XYLENES	12 U	12 U	NA	NA	2 J	11 U	NA	12 U	NA	NA
TRANS-1,3-DICHLOROPROPENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
TRICHLOROETHENE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
VINYL CHLORIDE	12 U	12 U	NA	NA	11 U	11 U	NA	12 U	NA	NA
SEMIVOLATILES (UG/KG)										
1,2,4-TRICHLOROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
1,2-DICHLOROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
1,3-DICHLOROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
1,4-DICHLOROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	420 UJ	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2,4,5-TRICHLOROPHENOL	1100 U	1000 U	NA	NA	960 U	930 U	NA	1000 U	NA	NA
2,4,6-TRICHLOROPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2,4-DICHLOROPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2,4-DIMETHYLPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP13-0506-D	B6-S6	DSY-S-TP24-1011	DSY-S-TP24-0102	DSY-S-TP24-0102-D	DSY-S-TP24-0507	DSY-S-TP25-1011	DSY-S-TP25-0507	DPSOIL02
LOCATION ID	DSY-MW-02	DSY-TP-13	DSY-TP-14	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-25	DSY-TP-25	DSY-TP-DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROPHENOL	1100 U	1000 UJ	NA	NA	960 U	930 UJ	NA	1000 UJ	NA	NA
2,4-DINITROTOLUENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2,6-DINITROTOLUENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2-CHLORONAPHTHALENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2-CHLOROPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2-METHYLNAPHTHALENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2-METHYLPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
2-NITROANILINE	1100 U	1000 U	NA	NA	960 U	930 U	NA	1000 U	NA	NA
2-NITROPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
3,3'-DICHLOOROBENZIDINE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
3-NITROANILINE	1100 U	1000 U	NA	NA	960 U	930 U	NA	1000 U	NA	NA
4,6-DINITRO-2-METHYLPHENOL	1100 U	1000 U	NA	NA	960 U	930 UJ	NA	1000 U	NA	NA
4-BROMOPHENYL PHENYL ETHER	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
4-CHLORO-3-METHYLPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
4-CHLOROANILINE	420 UJ	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
4-CHLOROPHENYL PHENYL ETHER	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
4-METHYLPHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
4-NITROANILINE	1100 U	1000 U	NA	NA	960 U	930 U	NA	1000 U	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP13-0506-D	B6-S6	DSY-S-TP24-1011	DSY-S-TP24-0102	DSY-S-TP24-0102-D	DSY-S-TP24-0507	DSY-S-TP25-1011	DSY-S-TP25-0507	DPSOIL02
LOCATION ID	DSY-MW-02	DSY-TP-13	DSY-TP-14	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-25	DSY-TP-25	DSY-TP-DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4-NITROPHENOL	1100 U	1000 UJ	NA	NA	960 U	930 U	NA	1000 UJ	NA	NA
ACENAPHTHENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
ACENAPHTHYLENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
ANTHRACENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
BENZO(A)ANTHRACENE	420 U	400 U	90 J	NA	380 U	53 J	NA	47 J	NA	NA
BENZO(A)PYRENE	420 UJ	400 UJ	87 J	NA	380 U	44 J	NA	42 J	NA	NA
BENZO(B)FLUORANTHENE	420 UJ	400 UJ	150 J	NA	380 U	71 J	NA	70 J	NA	NA
BENZO(G,H,I)PERYLENE	420 UJ	400 UJ	45 J	NA	380 U	370 U	NA	400 UJ	NA	NA
BENZO(K)FLUORANTHENE	420 UJ	400 UJ	52 J	NA	380 U	370 U	NA	400 UJ	NA	NA
BIS(2-CHLOROETHOXY)METHAN E	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
BIS(2-CHLOROETHYL)ETHER	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	420 U	400 U	NA	NA	97 J	43 J	NA	400 U	NA	160 J
BUTYL BENZYL PHTHALATE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
CARBAZOLE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
CHRYSENE	420 U	400 U	130 J	NA	380 U	44 J	NA	67 J	NA	NA
DIBENZO(A,H)ANTHRACEN E	420 UJ	400 UJ	NA	NA	380 U	370 U	NA	400 UJ	NA	NA
DIBENZOFURAN	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
DIETHYL PHTHALATE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
DIMETHYL PHTHALATE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP13-0506-D	B6-S6	DSY-S-TP24-1011	DSY-S-TP24-0102	DSY-S-TP24-0102-D	DSY-S-TP24-0507	DSY-S-TP25-1011	DSY-S-TP25-0507	DPSOIL02
LOCATION ID	DSY-MW-02	DSY-TP-13	DSY-TP-14	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-25	DSY-TP-25	DSY-TP-DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-BUTYL PHTHALATE	45 J	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
DI-N-OCTYL PHTHALATE	420 UJ	400 UJ	NA	NA	380 U	370 U	NA	400 UJ	NA	NA
FLUORANTHENE	420 U	400 U	170 J	NA	380 U	81 J	NA	97 J	NA	84 J
FLUORENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
HEXACHLOROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
HEXACHLOROBUTADIENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
HEXACHLOROCYCLOPENTADIENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
HEXACHLOROETHANE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
HIGH MOLECULAR WEIGHT PAHS	420 U	400 U	874	NA	380 U	293	NA	443	NA	NA
INDENO(1,2,3-CD)PYRENE	420 UJ	400 UJ	NA	NA	380 U	370 U	NA	400 UJ	NA	NA
ISOPHORONE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
LOW MOLECULAR WEIGHT PAHS	420 U	43	NA	NA	380 U	54	NA	81	NA	140
NAPHTHALENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	77 J
NITROBENZENE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
N-NITROSODIPHENYLAMINE	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
PENTACHLOROPHENOL	1100 U	1000 U	NA	NA	960 U	930 U	NA	1000 U	NA	NA
PHENANTHRENE	420 U	43 J	130 J	NA	380 U	54 J	NA	81 J	NA	63 J
PHENOL	420 U	400 U	NA	NA	380 U	370 U	NA	400 U	NA	NA
PYRENE	420 U	400 U	150 J	NA	380 U	370 U	NA	120 J	NA	58 J

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP13-0506-D	B6-S6	DSY-S-TP24-1011	DSY-S-TP24-0102	DSY-S-TP24-0102-D	DSY-S-TP24-0507	DSY-S-TP25-1011	DSY-S-TP25-0507	DPSOIL02
LOCATION ID	DSY-MW-02	DSY-TP-13	DSY-TP-14	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-25	DSY-TP-25	DSY-TP-DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	420 U	43	1004	NA	380 U	347	NA	524	NA	282
PESTICIDES/PCBS (UG/KG)										
4,4'-DDD	0 R	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
4,4'-DDE	0 R	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
4,4'-DDT	4.3 U	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ALDRIN	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
ALPHA-BHC	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
ALPHA-CHLORDANE	0 R	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
AROCLOR-1016	43 U	40 U	NA	NA	34 UJ	35 U	NA	40 U	NA	NA
AROCLOR-1221	85 U	40 U	NA	NA	34 UJ	35 U	NA	40 U	NA	NA
AROCLOR-1232	43 U	40 U	NA	NA	34 UJ	35 U	NA	40 U	NA	NA
AROCLOR-1242	43 U	40 U	NA	NA	34 UJ	35 U	NA	40 U	NA	NA
AROCLOR-1248	43 U	40 U	NA	NA	34 UJ	35 U	NA	40 U	NA	NA
AROCLOR-1254	43 U	40 U	NA	NA	34 UJ	35 U	NA	40 U	NA	NA
AROCLOR-1260	43 U	40 U	NA	NA	34 UJ	35 U	NA	13 J	NA	NA
BETA-BHC	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
DELTA-BHC	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
DIELDRIN	0 R	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ENDOSULFAN I	0 R	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
ENDOSULFAN II	0 R	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ENDOSULFAN SULFATE	4.3 U	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ENDRIN	0 R	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ENDRIN ALDEHYDE	4.3 U	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
ENDRIN KETONE	4.3 U	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP13-0506-D	B6-S6	DSY-S-TP24-1011	DSY-S-TP24-0102	DSY-S-TP24-0102-D	DSY-S-TP24-0507	DSY-S-TP25-1011	DSY-S-TP25-0507	DPSOIL02
LOCATION ID	DSY-MW-02	DSY-TP-13	DSY-TP-14	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-25	DSY-TP-25	DSY-TP-DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
GAMMA-CHLORDANE	0 R	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
HEPTACHLOR	2.2 U	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
HEPTACHLOR EPOXIDE	0 R	2.1 U	NA	NA	1.8 UJ	1.8 U	NA	2.1 U	NA	NA
METHOXYCHLOR	22 U	21 U	NA	NA	18 UJ	18 U	NA	21 U	NA	NA
PCB-209	4.3 U	4 U	NA	NA	3.4 UJ	3.5 U	NA	4 U	NA	NA
SUM OF PCB CONGENERS X 2	4.3 U	4 U	NA	NA	3.4 U	3.5 U	NA	4 U	NA	NA
TOTAL AROCLOR	NA	NA	95	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	220 U	210 U	NA	NA	180 UJ	180 U	NA	210 U	NA	NA
METALS (MG/KG)										
ALUMINUM	4890	11200	NA	6600	4940	4960	5920	10800	11100	NA
ANTIMONY	11.8 UJ	9.6 UJ	NA	7.8 UJ	8.1 UJ	8.1 UJ	7.8 UJ	10.5 UJ	11.3 UJ	NA
ARSENIC	4.3	18	16	3.4	5.7 J	5.5 J	5.1	13	15.6	NA
BARIUM	3.2	25.7	NA	12.7	13 J	12.9 J	10.9	18.4	18.5	NA
BERYLLIUM	0.23 U	0.42 J	NA	0.27 J	0.25 J	0.19 J	0.23 J	0.38 J	0.44 J	NA
CADMIUM	0.68 U	0.55 UJ	1.4	0.45 UJ	0.46 U	0.47 U	0.45 UJ	0.61 UJ	1.2 UJ	NA
CALCIUM	3480	414	NA	480	318	305	635	1650	1160	NA
CHROMIUM	10.9 J	14.3	10	9	6.3	6.1	9.5	13	10.1	NA
COBALT	5.2	11 J	NA	7.2 J	9	9	7 J	10.1 J	13.1	NA
COPPER	8.6	11	NA	19.6	20.7	18.7	13.4	25.1	27.9	NA
IRON	13500	24700	NA	17100	17700	17400	18200	24800	27400	NA
LEAD	6 J	11.3	23	7.9	7.5 J	7.3 J	6.3	18.6	26.4	NA
MAGNESIUM	1950	2460	NA	2290	1920	1910	2280	3240	3220	NA
MANGANESE	97.9	584 J	NA	213 J	400 J	329 J	210 J	378 J	377	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP13-0506-D	B6-S6	DSY-S-TP24-1011	DSY-S-TP24-0102	DSY-S-TP24-0102-D	DSY-S-TP24-0507	DSY-S-TP25-1011	DSY-S-TP25-0507	DPSOIL02
LOCATION ID	DSY-MW-02	DSY-TP-13	DSY-TP-14	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-25	DSY-TP-25	DSY-TP-DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MERCURY	0.06 U	0.13 U	NA	0.09 UJ	0.05 U	0.05 U	0.08 UJ	0.11 U	0.05 U	NA
NICKEL	8.9	16.5	NA	14.3	15.7 UJ	14.9	14.4	20	22.7	NA
POTASSIUM	191	238	NA	301	407	448	361	363	350	NA
SELENIUM	0.91 UJ	0.74 U	NA	0.6 U	0.69 J	0.63 J	0.6 J	0.86 J	0.87 U	NA
SILVER	1.4 UJ	1.1 U	NA	0.89 U	0.93 U	0.93 U	0.9 U	1.2 U	1.3 U	NA
SODIUM	66.3 U	94.5	NA	28.9 U	23.1	23	33.2 U	97.8	66.9 UJ	NA
THALLIUM	1.4 U	1.1 UJ	NA	0.89 UJ	0.93 UJ	0.93 UJ	0.9 UJ	1.2 UJ	1.3 U	NA
VANADIUM	11	18 J	NA	9.5 J	9 J	8.9 J	10.9 J	15.2 J	17.6 J	NA
ZINC	37	40.2	NA	35.4	40.1	39.1	36.8	56.7	62.1	NA
MISCELLANEOUS PARAMETERS (UG/KG)										
DIBUTYLTIN	50 U	49 U	NA	NA	50 UJ	49 UJ	NA	50 U	NA	NA
MONOBUTYLTIN	50 U	49 U	NA	NA	50 UJ	49 UJ	NA	50 U	NA	NA
TETRABUTYLTIN	50 U	4.6 J	NA	NA	3.3 J	8.5 J	NA	50 U	NA	NA
TRIBUTYLTIN	2.2 J	49 U	NA	NA	50 UJ	49 UJ	NA	50 U	NA	NA
PETROLEUM HYDROCARBONS (MG/KG)										
CREOSOTE	76 U	60 U	NA	NA	180 U	170 U	NA	150	NA	NA
TOTAL PETROLEUM HYDROCARBONS	NA	NA	21	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)										
ARSENIC	4 U	24.3 U	NA	NA	5.8 J	4 U	NA	16.7 U	NA	NA
BARIUM	53.8	283	NA	NA	109 U	225	NA	129 U	NA	NA
CADMIUM	3 U	3 U	NA	NA	3 U	4 UJ	NA	3 U	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-1820	DSY-S-TP13-0506-D	B6-S6	DSY-S-TP24-1011	DSY-S-TP24-0102	DSY-S-TP24-0102-D	DSY-S-TP24-0507	DSY-S-TP25-1011	DSY-S-TP25-0507	DPSOIL02
LOCATION ID	DSY-MW-02	DSY-TP-13	DSY-TP-14	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-24	DSY-TP-25	DSY-TP-25	DSY-TP-DPSOIL
SAMPLE DATE	08/08/96	07/26/96	01/01/00	07/23/96	07/23/96	07/23/96	07/23/96	07/25/96	07/25/96	01/01/99
TOP DEPTH	18 FT	5 FT	1 FT	10 FT	1 FT	1 FT	5 FT	10 FT	5 FT	3 FT
BOTTOM DEPTH	20 FT	6 FT	1.5 FT	11 FT	2 FT	2 FT	7 FT	11 FT	7 FT	3 FT
SACODE	NORMAL	DUP	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CHROMIUM	6 U	6 U	NA	NA	6 U	6 U	NA	6 U	NA	NA
LEAD	24.7	5	NA	NA	3.6 U	1.2 UJ	NA	21.9	NA	NA
MERCURY	0.1 U	0.1 UJ	NA	NA	0.1 U	0.1 U	NA	0.1 UJ	NA	NA
SELENIUM	4 U	4 U	NA	NA	8.3 U	5.1 UJ	NA	4 U	NA	NA
SILVER	6 U	0 R	NA	NA	6 U	6 U	NA	0 R	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP12-0507	DSY-S-TP15-1112	DSY-S-TP15-0506	DSY-S-TP16-1112	DSY-S-TP16-0506	DSY-S-TP17-1112	DSY-S-TP17-0507	DSY-S-TP18-1011	DSY-S-TP18-0507	DSY-S-TP19-1011	DSY-S-TP19-0507	DSY-S-TP20-1011
LOCATION ID	DSY-TP-12	DSY-TP-12	DSY-TP-15	DSY-TP-15	DSY-TP-16	DSY-TP-16	DSY-TP-17	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-19	DSY-TP-20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROBENZENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CHLORODIBROMOMETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROFORM	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROMETHANE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP12-0507	DSY-S-TP15-1112	DSY-S-TP15-0506	DSY-S-TP16-1112	DSY-S-TP16-0506	DSY-S-TP17-1112	DSY-S-TP17-0507	DSY-S-TP18-1011	DSY-S-TP18-0507	DSY-S-TP19-1011	DSY-S-TP19-0507	DSY-S-TP20-1011
LOCATION ID	DSY-TP-12	DSY-TP-12	DSY-TP-15	DSY-TP-15	DSY-TP-16	DSY-TP-16	DSY-TP-17	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-19	DSY-TP-20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
STYRENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
TETRACHLOROETHENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
TOLUENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL 1,2-DICHLOROETHENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL XYLENES	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
VINYL CHLORIDE	NA	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	NA	NA
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP12-0507	DSY-S-TP15-1112	DSY-S-TP15-0506	DSY-S-TP16-1112	DSY-S-TP16-0506	DSY-S-TP17-1112	DSY-S-TP17-0507	DSY-S-TP18-1011	DSY-S-TP18-0507	DSY-S-TP19-1011	DSY-S-TP19-0507	DSY-S-TP20-1011
LOCATION ID	DSY-TP-12	DSY-TP-12	DSY-TP-15	DSY-TP-15	DSY-TP-16	DSY-TP-16	DSY-TP-17	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-19	DSY-TP-20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-NITROANILINE	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
2-NITROPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
3-NITROANILINE	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-BROMOPHENYL PHENYL ETHER	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLOROPHENYL PHENYL ETHER	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-NITROANILINE	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
4-NITROPHENOL	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHYLENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP12-0507	DSY-S-TP15-1112	DSY-S-TP15-0506	DSY-S-TP16-1112	DSY-S-TP16-0506	DSY-S-TP17-1112	DSY-S-TP17-0507	DSY-S-TP18-1011	DSY-S-TP18-0507	DSY-S-TP19-1011	DSY-S-TP19-0507	DSY-S-TP20-1011
LOCATION ID	DSY-TP-12	DSY-TP-12	DSY-TP-15	DSY-TP-15	DSY-TP-16	DSY-TP-16	DSY-TP-17	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-19	DSY-TP-20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
BENZO(A)ANTHRACENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHAN E	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
BUTYL BENZYL PHTHALATE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
CARBAZOLE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACEN E	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
DIBENZOFURAN	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
DIETHYL PHTHALATE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
DIMETHYL PHTHALATE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
DI-N-BUTYL PHTHALATE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP12-0507	DSY-S-TP15-1112	DSY-S-TP15-0506	DSY-S-TP16-1112	DSY-S-TP16-0506	DSY-S-TP17-1112	DSY-S-TP17-0507	DSY-S-TP18-1011	DSY-S-TP18-0507	DSY-S-TP19-1011	DSY-S-TP19-0507	DSY-S-TP20-1011
LOCATION ID	DSY-TP-12	DSY-TP-12	DSY-TP-15	DSY-TP-15	DSY-TP-16	DSY-TP-16	DSY-TP-17	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-19	DSY-TP-20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-OCTYL PHTHALATE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
FLUORENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
HIGH MOLECULAR WEIGHT PAHS	NA	NA	NA	NA	1600	NA	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	11000 UJ	NA	NA	NA	NA	NA	NA	NA	NA
ISOPHORONE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
LOW MOLECULAR WEIGHT PAHS	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
NITROBENZENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA	NA	28000 U	NA	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
PHENOL	NA	NA	NA	NA	11000 U	NA	NA	NA	NA	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA	1600 J	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP12-0507	DSY-S-TP15-1112	DSY-S-TP15-0506	DSY-S-TP16-1112	DSY-S-TP16-0506	DSY-S-TP17-1112	DSY-S-TP17-0507	DSY-S-TP18-1011	DSY-S-TP18-0507	DSY-S-TP19-1011	DSY-S-TP19-0507	DSY-S-TP20-1011
LOCATION ID	DSY-TP-12	DSY-TP-12	DSY-TP-15	DSY-TP-15	DSY-TP-16	DSY-TP-16	DSY-TP-17	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-19	DSY-TP-20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	NA	NA	NA	NA	1600	NA	NA	NA	NA	NA	NA	NA	NA
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	4.4 J	NA	NA	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	37 U	NA	NA	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	15	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA

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TABLE
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FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP12-0507	DSY-S-TP15-1112	DSY-S-TP15-0506	DSY-S-TP16-1112	DSY-S-TP16-0506	DSY-S-TP17-1112	DSY-S-TP17-0507	DSY-S-TP18-1011	DSY-S-TP18-0507	DSY-S-TP19-1011	DSY-S-TP19-0507	DSY-S-TP20-1011
LOCATION ID	DSY-TP-12	DSY-TP-12	DSY-TP-15	DSY-TP-15	DSY-TP-16	DSY-TP-16	DSY-TP-17	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-19	DSY-TP-20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	3.1 J	NA	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	19 U	NA	NA	NA	NA	NA	NA	NA	NA
PCB-209	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
SUM OF PCB CONGENERS X 2	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	190 U	NA	NA	NA	NA	NA	NA	NA	NA
METALS (MG/KG)													
ALUMINUM	14300	11700	7360	10200	7820	2470	8330	6420	3860	3300	2950	2620	3350
ANTIMONY	11.7 UJ	11.2 UJ	10.8 UJ	11.1 UJ	10.4 UJ	10.9 UJ	10.2 UJ	10.6 UJ	11.4 UJ	10.8 UJ	13.2 UJ	10.2 UJ	13.1 UJ
ARSENIC	37.3	24.1	6.1 J	11.4	16.6	3.1 J	8.7	13.6	3.8 J	4.4 J	3 J	2.7 J	4.3 J
BARIUM	11.3	13.8	9.4	15	6.3	2.6 U	16.1	8.5	5.7 U	3.4 U	4.8 U	3 U	5 U
BERYLLIUM	0.44 J	0.52	0.39 J	0.49	0.27 J	0.21 U	0.24 J	0.4 J	0.22 U	0.21 U	0.25 U	0.2 U	0.25 U
CADMIUM	1.3 UJ	1.1 UJ	1.1 UJ	1 UJ	0.6 UJ	1.1 UJ	0.59 U	0.99 UJ	0.66 U	0.63 U	0.76 U	0.6 UJ	0.76 U
CALCIUM	1070	891	690	872	1110	326	785	589	506	441	465	379	603
CHROMIUM	12.6	10.4	6.8	10.1	12.3	2.2	7.2	6.3	4.3	3.4	3.4	3.6	4.4
COBALT	18.5	12.7	8.5	13.6	9.4 J	2.6 UJ	10.6	16.2	6	3.1 UJ	5.7	3.1 UJ	5.8
COPPER	26	18.6	14.3	23.7	15.2	4.1 UJ	16	25.7	10.4	7.3	4.8 UJ	6.2	6.7
IRON	35000	30200	17300	25200	23600	8170	20400	17700	11100	10900	8020	8340	12000
LEAD	21.2	12.1	5.7	11.2	16.1	1.6 J	10.5	13	4.6	2.7	1.9 J	2.1	4
MAGNESIUM	4530	3450	2470	3570	2680	956	2820	2240	1500	1280	1130	956	1440
MANGANESE	514	315	225	326	262 J	102	524	340	421	75	83.6	55.4	173
MERCURY	0.05 U	0.06 U	0.05 U	0.05 U	0.11 U	0.15 UJ	0.05 U	0.05 U	0.06 UJ	0.06 UJ	0.12 UJ	0.07 UJ	0.12 UJ

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FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP12-0507	DSY-S-TP15-1112	DSY-S-TP15-0506	DSY-S-TP16-1112	DSY-S-TP16-0506	DSY-S-TP17-1112	DSY-S-TP17-0507	DSY-S-TP18-1011	DSY-S-TP18-0507	DSY-S-TP19-1011	DSY-S-TP19-0507	DSY-S-TP20-1011
LOCATION ID	DSY-TP-12	DSY-TP-12	DSY-TP-15	DSY-TP-15	DSY-TP-16	DSY-TP-16	DSY-TP-17	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-19	DSY-TP-20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
NICKEL	30.4	23.2	13.8	22.8	18.3	5.1	18	14.6	6.8	6.9	9.2	5.2	7.8
POTASSIUM	241	267	329	427	187	138	263	259	224	232	186	179	227
SELENIUM	0.9 U	0.86 U	0.83 U	0.86 U	0.8 U	0.83 U	0.79 U	0.82 U	0.87 U	0.83 U	1 U	0.79 U	1 U
SILVER	1.6 J	1.3 U	1.2 U	1.3 U	1.2 U	1.3 U	1.2 U	1.2 U	1.3 U	1.3 U	1.5 U	1.2 U	1.5 U
SODIUM	50.4 UJ	44.2 UJ	26.1 UJ	32.3 UJ	26.1 U	30.1 UJ	33.8 UJ	33.6 UJ	34.9 UJ	25.9 UJ	34 UJ	22.2 UJ	117
THALLIUM	1.4 U	1.3 U	1.2 U	1.3 U	1.2 UJ	1.3 U	1.2 U	1.2 U	1.3 U	1.3 U	1.5 U	1.2 U	1.5 U
VANADIUM	18.8 J	17.1 J	11.4	15.9 J	14.2 J	5.6	11.9 J	9.7	6.5	7.1	6.2	6.2	7.6
ZINC	66.1	50.9	35.4	50.6	50.5	14.6	38.8	41.5	20.6	18.2	23.6	16.4	24.5
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	NA	NA	NA	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA
MONOBUTYLTIN	NA	NA	NA	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA
TETRABUTYLTIN	NA	NA	NA	NA	5.1 J	NA	NA	NA	NA	NA	NA	NA	NA
TRIBUTYLTIN	NA	NA	NA	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	NA	NA	NA	NA	1200	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	NA	NA	NA	NA	4 U	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	NA	NA	NA	NA	70 U	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	NA	NA	NA	NA	3 U	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	NA	NA	NA	NA	6 U	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	NA	NA	NA	NA	6.1	NA	NA	NA	NA	NA	NA	NA	NA
MERCURY	NA	NA	NA	NA	0.1 UJ	NA	NA	NA	NA	NA	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP12-0507	DSY-S-TP15-1112	DSY-S-TP15-0506	DSY-S-TP16-1112	DSY-S-TP16-0506	DSY-S-TP17-1112	DSY-S-TP17-0507	DSY-S-TP18-1011	DSY-S-TP18-0507	DSY-S-TP19-1011	DSY-S-TP19-0507	DSY-S-TP20-1011
LOCATION ID	DSY-TP-12	DSY-TP-12	DSY-TP-15	DSY-TP-15	DSY-TP-16	DSY-TP-16	DSY-TP-17	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-19	DSY-TP-20
SAMPLE DATE	07/26/96	07/26/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96
TOP DEPTH	12 FT	5 FT	11 FT	5 FT	11 FT	5 FT	11 FT	5 FT	10 FT	5 FT	10 FT	5 FT	10 FT
BOTTOM DEPTH	13 FT	7 FT	12 FT	6 FT	12 FT	6 FT	12 FT	7 FT	11 FT	7 FT	11 FT	7 FT	11 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
SELENIUM	NA	NA	NA	NA	4 U	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	NA	NA	NA	NA	0 R	NA	NA	NA	NA	NA	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP20-0507	DSY-S-TP21-1011	DSY-S-TP21-0507	DSY-S-TP22-1112	DSY-S-TP22-0506	DSY-S-TP23-0910	DSY-S-TP23-0507	DSY-S-TP26-0910	DSY-S-TP26-0305	DSY-S-TP26-0406	DSY-S-TP27-1011	DSY-S-TP27-0507
LOCATION ID	DSY-TP-12	DSY-TP-20	DSY-TP-21	DSY-TP-21	DSY-TP-22	DSY-TP-22	DSY-TP-23	DSY-TP-23	DSY-TP-26	DSY-TP-26	DSY-TP-26	DSY-TP-27	DSY-TP-27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 UJ	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
ACETONE	NA	NA	NA	NA	NA	NA	16	NA	NA	110 U	NA	NA	NA
BENZENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CHLOROBENZENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CHLORODIBROMOMETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CHLOROFORM	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
CHLOROMETHANE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP20-0507	DSY-S-TP21-1011	DSY-S-TP21-0507	DSY-S-TP22-1112	DSY-S-TP22-0506	DSY-S-TP23-0910	DSY-S-TP23-0507	DSY-S-TP26-0910	DSY-S-TP26-0305	DSY-S-TP26-0406	DSY-S-TP27-1011	DSY-S-TP27-0507
LOCATION ID	DSY-TP-12	DSY-TP-20	DSY-TP-21	DSY-TP-21	DSY-TP-22	DSY-TP-22	DSY-TP-23	DSY-TP-23	DSY-TP-26	DSY-TP-26	DSY-TP-26	DSY-TP-27	DSY-TP-27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	66 J	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
STYRENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
TETRACHLOROETHENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
TOLUENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
TOTAL 1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
TOTAL XYLENES	NA	NA	NA	NA	NA	NA	12 U	NA	NA	150	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
TRICHLOROETHENE	NA	NA	NA	NA	NA	NA	1 J	NA	NA	110 U	NA	NA	NA
VINYL CHLORIDE	NA	NA	NA	NA	NA	NA	12 U	NA	NA	110 U	NA	NA	NA
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 UJ	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP20-0507	DSY-S-TP21-1011	DSY-S-TP21-0507	DSY-S-TP22-1112	DSY-S-TP22-0506	DSY-S-TP23-0910	DSY-S-TP23-0507	DSY-S-TP26-0910	DSY-S-TP26-0305	DSY-S-TP26-0406	DSY-S-TP27-1011	DSY-S-TP27-0507
LOCATION ID	DSY-TP-12	DSY-TP-20	DSY-TP-21	DSY-TP-21	DSY-TP-22	DSY-TP-22	DSY-TP-23	DSY-TP-23	DSY-TP-26	DSY-TP-26	DSY-TP-26	DSY-TP-27	DSY-TP-27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	14000	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
2-NITROANILINE	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
2-NITROPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
3-NITROANILINE	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
4-BROMOPHENYL PHENYL ETHER	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
4-CHLOROPHENYL PHENYL ETHER	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
4-NITROANILINE	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
4-NITROPHENOL	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
ACENAPHTHENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
ACENAPHTHYLENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	900 J	NA	NA	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP20-0507	DSY-S-TP21-1011	DSY-S-TP21-0507	DSY-S-TP22-1112	DSY-S-TP22-0506	DSY-S-TP23-0910	DSY-S-TP23-0507	DSY-S-TP26-0910	DSY-S-TP26-0305	DSY-S-TP26-0406	DSY-S-TP27-1011	DSY-S-TP27-0507
LOCATION ID	DSY-TP-12	DSY-TP-20	DSY-TP-21	DSY-TP-21	DSY-TP-22	DSY-TP-22	DSY-TP-23	DSY-TP-23	DSY-TP-26	DSY-TP-26	DSY-TP-26	DSY-TP-27	DSY-TP-27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BIS(2-CHLOROETHOXY)METHAN E	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	NA	NA	65 J	NA	NA	3900 U	NA	NA	NA
BUTYL BENZYL PHTHALATE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
CARBAZOLE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
DIBENZO(A,H)ANTHRACEN E	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
DIBENZOFURAN	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
DIETHYL PHTHALATE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
DIMETHYL PHTHALATE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
DI-N-BUTYL PHTHALATE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP20-0507	DSY-S-TP21-1011	DSY-S-TP21-0507	DSY-S-TP22-1112	DSY-S-TP22-0506	DSY-S-TP23-0910	DSY-S-TP23-0507	DSY-S-TP26-0910	DSY-S-TP26-0305	DSY-S-TP26-0406	DSY-S-TP27-1011	DSY-S-TP27-0507
LOCATION ID	DSY-TP-12	DSY-TP-20	DSY-TP-21	DSY-TP-21	DSY-TP-22	DSY-TP-22	DSY-TP-23	DSY-TP-23	DSY-TP-26	DSY-TP-26	DSY-TP-26	DSY-TP-27	DSY-TP-27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
DI-N-OCTYL PHTHALATE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
FLUORENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	2100 J	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
HIGH MOLECULAR WEIGHT PAHS	NA	NA	NA	NA	NA	NA	410 U	NA	NA	460	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
ISOPHORONE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
LOW MOLECULAR WEIGHT PAHS	NA	NA	NA	NA	NA	NA	410 U	NA	NA	24000	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	2200 J	NA	NA	NA
NITROBENZENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
N-NITROSODIPHENYLAMINE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA	NA	NA	NA	1000 U	NA	NA	9900 U	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	4800	NA	NA	NA
PHENOL	NA	NA	NA	NA	NA	NA	410 U	NA	NA	3900 U	NA	NA	NA
PYRENE	NA	NA	NA	NA	NA	NA	410 U	NA	NA	460 J	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP20-0507	DSY-S-TP21-1011	DSY-S-TP21-0507	DSY-S-TP22-1112	DSY-S-TP22-0506	DSY-S-TP23-0910	DSY-S-TP23-0507	DSY-S-TP26-0910	DSY-S-TP26-0305	DSY-S-TP26-0406	DSY-S-TP27-1011	DSY-S-TP27-0507
LOCATION ID	DSY-TP-12	DSY-TP-20	DSY-TP-21	DSY-TP-21	DSY-TP-22	DSY-TP-22	DSY-TP-23	DSY-TP-23	DSY-TP-26	DSY-TP-26	DSY-TP-26	DSY-TP-27	DSY-TP-27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TOTAL PAHS	NA	NA	NA	NA	NA	NA	410 U	NA	NA	24460	NA	NA	NA
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA	35 U	NA	NA	40 U	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP20-0507	DSY-S-TP21-1011	DSY-S-TP21-0507	DSY-S-TP22-1112	DSY-S-TP22-0506	DSY-S-TP23-0910	DSY-S-TP23-0507	DSY-S-TP26-0910	DSY-S-TP26-0305	DSY-S-TP26-0406	DSY-S-TP27-1011	DSY-S-TP27-0507
LOCATION ID	DSY-TP-12	DSY-TP-20	DSY-TP-21	DSY-TP-21	DSY-TP-22	DSY-TP-22	DSY-TP-23	DSY-TP-23	DSY-TP-26	DSY-TP-26	DSY-TP-26	DSY-TP-27	DSY-TP-27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	4	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	2 U	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA	18 U	NA	NA	20 U	NA	NA	NA
PCB-209	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
SUM OF PCB CONGENERS X 2	NA	NA	NA	NA	NA	NA	3.5 U	NA	NA	4 U	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA	180 U	NA	NA	200 U	NA	NA	NA
METALS (MG/KG)													
ALUMINUM	14300	4070	3740	3010	10000	7700	5810	6060	10200	1690	10100	2570	3480
ANTIMONY	11.7 UJ	11.1 UJ	13.4 UJ	10.6 UJ	10.4 UJ	11.8 UJ	8.7 UJ	10.6 UJ	9.4 UJ	9.7 UJ	10.5 UJ	9.3 UJ	10.6 UJ
ARSENIC	37.3	3.9 J	2.7 J	3.1 J	7	8.1	4.6 J	5.5	17.8	1.2 J	42	4.7 UJ	4.1 UJ
BARIUM	11.3	4.3 U	4.3 U	6 U	24.9	17.6	10.1	10.1	33.6	9.7	28.7	2.4 UJ	2.1 UJ
BERYLLIUM	0.44 J	0.21 U	0.26 U	0.2 U	0.35 J	0.3 J	0.24 J	0.22 J	0.51	0.19 U	0.44 J	0.18 UJ	0.2 UJ
CADMIUM	1.3 UJ	0.65 UJ	0.77 U	0.61 U	0.65 J	0.81 UJ	0.5 U	0.61 UJ	0.54 U	0.56 U	0.6 U	0.54 UJ	0.61 UJ
CALCIUM	1070	423	507	448	529	454	493	556	1720	1590	1100	472	543
CHROMIUM	12.6	4	4.8	2.8	14.6	7.6	7	8.4	20.1	2.2 J	14.8	3.7 J	5.7 J
COBALT	18.5	3 UJ	5	3.2 UJ	13.8 J	9.9	8.3	8.9	11.5	1.1 J	11.5	3 J	4 J
COPPER	26	6.2	5.8	5.4	16.8	17.7	19.9	18.2	34.7	34.9	21.9	4.1 J	5 J
IRON	35000	11200	10600	9380	25600	18400	16200	18900	24700	4060	25500	6970	10400
LEAD	21.2	3.2	3.6	3.4	8.6	6.3	6.2 J	7.3	28.4 J	3.2 J	75 J	1.6 J	2.5 J
MAGNESIUM	4530	1470	1460	1150	3460	2460	2130	2180	2390	534	2850	1030	1340
MANGANESE	514	70.4	125	93.2	549 J	322	218 J	308	363	108	342	55.4 J	106 J
MERCURY	0.05 U	0.08 UJ	0.09 UJ	0.06 UJ	0.08 UJ	0.18 UJ	0.06 U	0.1 UJ	0.05 U	0.05 U	0.06	0.06 U	0.05 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP20-0507	DSY-S-TP21-1011	DSY-S-TP21-0507	DSY-S-TP22-1112	DSY-S-TP22-0506	DSY-S-TP23-0910	DSY-S-TP23-0507	DSY-S-TP26-0910	DSY-S-TP26-0305	DSY-S-TP26-0406	DSY-S-TP27-1011	DSY-S-TP27-0507
LOCATION ID	DSY-TP-12	DSY-TP-20	DSY-TP-21	DSY-TP-21	DSY-TP-22	DSY-TP-22	DSY-TP-23	DSY-TP-23	DSY-TP-26	DSY-TP-26	DSY-TP-26	DSY-TP-27	DSY-TP-27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
NICKEL	30.4	7.5	11.4	6.8	25	16.6	14.1 UJ	14.1	25.5 J	2.3 J	18.8 J	5.2 J	6.2 J
POTASSIUM	241	191	188	187	639	518	306	314	444	265	469	134	132
SELENIUM	0.9 U	0.85 U	1 U	0.81 U	0.8 U	0.91 U	0.67 U	1.1	0.72 U	0.75 U	0.81 J	0.83 J	0 R
SILVER	1.6 J	1.3 U	1.5 U	1.2 U	1.2 U	1.4 U	1 U	1.2 U	1.1 UJ	1.1 UJ	1.2 UJ	1.1 UJ	1.2 UJ
SODIUM	50.4 UJ	29.6 UJ	50.4 UJ	25.7 UJ	59 U	26.5 UJ	42.5	52.5 U	144	22.6 J	59.1	24.9 U	16.8 U
THALLIUM	1.4 U	1.3 U	1.5 U	1.2 U	1.2 UJ	1.4 U	1 UJ	1.2 UJ	1.1 U	1.1 U	1.2 U	0 R	0 R
VANADIUM	18.8 J	8.1	7.9	6.2	16.1 J	12.8	7.6	9.3	16.2 J	4.4 J	18.2 J	4.3	6.4
ZINC	66.1	21.9	24.8	17.7	52.2	34.3	33.2	35.1	117	10 J	80.1	13.6 J	18.6 J
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	NA	NA	NA	NA	NA	NA	49 UJ	NA	NA	50 U	NA	NA	NA
MONOBUTYLTIN	NA	NA	NA	NA	NA	NA	49 UJ	NA	NA	50 U	NA	NA	NA
TETRABUTYLTIN	NA	NA	NA	NA	NA	NA	49 UJ	NA	NA	50 U	NA	NA	NA
TRIBUTYLTIN	NA	NA	NA	NA	NA	NA	49 UJ	NA	NA	50 U	NA	NA	NA
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	NA	NA	NA	NA	NA	NA	180 U	NA	NA	2200	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	NA	NA	NA	NA	NA	NA	4 U	NA	NA	4 U	NA	NA	NA
BARIUM	NA	NA	NA	NA	NA	NA	151 U	NA	NA	133	NA	NA	NA
CADMIUM	NA	NA	NA	NA	NA	NA	3 U	NA	NA	3 U	NA	NA	NA
CHROMIUM	NA	NA	NA	NA	NA	NA	7.8 UJ	NA	NA	6 U	NA	NA	NA
LEAD	NA	NA	NA	NA	NA	NA	1.6 UJ	NA	NA	1.7 UJ	NA	NA	NA
MERCURY	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	0.53 UJ	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP20-0507	DSY-S-TP21-1011	DSY-S-TP21-0507	DSY-S-TP22-1112	DSY-S-TP22-0506	DSY-S-TP23-0910	DSY-S-TP23-0507	DSY-S-TP26-0910	DSY-S-TP26-0305	DSY-S-TP26-0406	DSY-S-TP27-1011	DSY-S-TP27-0507
LOCATION ID	DSY-TP-12	DSY-TP-20	DSY-TP-21	DSY-TP-21	DSY-TP-22	DSY-TP-22	DSY-TP-23	DSY-TP-23	DSY-TP-26	DSY-TP-26	DSY-TP-26	DSY-TP-27	DSY-TP-27
SAMPLE DATE	07/26/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/23/96	07/26/96	07/29/96	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	5 FT	10 FT	5 FT	11 FT	5 FT	9 FT	5 FT	9 FT	3 FT	4 FT	10 FT	5 FT
BOTTOM DEPTH	13 FT	7 FT	11 FT	7 FT	12 FT	6 FT	10 FT	7 FT	10 FT	5 FT	6 FT	11 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
SELENIUM	NA	NA	NA	NA	NA	NA	4 U	NA	NA	4.2 UJ	NA	NA	NA
SILVER	NA	NA	NA	NA	NA	NA	6 U	NA	NA	27.5 UJ	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP28-1314	DSY-S-TP28-0507
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
VOLATILES (UG/KG)			
1,1,1-TRICHLOROETHANE	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA
2-BUTANONE	NA	NA	NA
2-HEXANONE	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA
ACETONE	NA	NA	NA
BENZENE	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA
BROMOFORM	NA	NA	NA
BROMOMETHANE	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA
CARBON TETRACHLORIDE	NA	NA	NA
CHLOROBENZENE	NA	NA	NA
CHLORODIBROMOMETHANE	NA	NA	NA
CHLOROETHANE	NA	NA	NA
CHLOROFORM	NA	NA	NA
CHLOROMETHANE	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP28-1314	DSY-S-TP28-0507
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	NA	NA	NA
ETHYLBENZENE	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA
STYRENE	NA	NA	NA
TETRACHLOROETHENE	NA	NA	NA
TOLUENE	NA	NA	NA
TOTAL 1,2-DICHLOROETHENE	NA	NA	NA
TOTAL XYLENES	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA
TRICHLOROETHENE	NA	NA	NA
VINYL CHLORIDE	NA	NA	NA
SEMIVOLATILES (UG/KG)			
1,2,4-TRICHLOROBENZENE	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP28-1314	DSY-S-TP28-0507
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
2,4-DINITROTOLUENE	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA
2-NITROANILINE	NA	NA	NA
2-NITROPHENOL	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA
3-NITROANILINE	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA
4-BROMOPHENYL PHENYL ETHER	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA
4-CHLOROPHENYL PHENYL ETHER	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA
4-NITROANILINE	NA	NA	NA
4-NITROPHENOL	NA	NA	NA
ACENAPHTHENE	NA	NA	NA
ACENAPHTHYLENE	NA	NA	NA
ANTHRACENE	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP28-1314	DSY-S-TP28-0507
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
BENZO(A)ANTHRACENE	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA
BIS(2-CHLOROETHOXY)METHAN E	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA
BUTYL BENZYL PHTHALATE	NA	NA	NA
CARBAZOLE	NA	NA	NA
CHRYSENE	NA	NA	NA
DIBENZO(A,H)ANTHRACEN E	NA	NA	NA
DIBENZOFURAN	NA	NA	NA
DIETHYL PHTHALATE	NA	NA	NA
DIMETHYL PHTHALATE	NA	NA	NA
DI-N-BUTYL PHTHALATE	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP28-1314	DSY-S-TP28-0507
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
DI-N-OCTYL PHTHALATE	NA	NA	NA
FLUORANTHENE	NA	NA	NA
FLUORENE	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA
HIGH MOLECULAR WEIGHT PAHS	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA
ISOPHORONE	NA	NA	NA
LOW MOLECULAR WEIGHT PAHS	NA	NA	NA
NAPHTHALENE	NA	NA	NA
NITROBENZENE	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA
N-NITROSODIPHENYLAMINE	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA
PHENANTHRENE	NA	NA	NA
PHENOL	NA	NA	NA
PYRENE	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP28-1314	DSY-S-TP28-0507
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
TOTAL PAHS	NA	NA	NA
PESTICIDES/PCBS (UG/KG)			
4,4'-DDD	NA	NA	NA
4,4'-DDE	NA	NA	NA
4,4'-DDT	NA	NA	NA
ALDRIN	NA	NA	NA
ALPHA-BHC	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA
AROCLOR-1016	NA	NA	NA
AROCLOR-1221	NA	NA	NA
AROCLOR-1232	NA	NA	NA
AROCLOR-1242	NA	NA	NA
AROCLOR-1248	NA	NA	NA
AROCLOR-1254	NA	NA	NA
AROCLOR-1260	NA	NA	NA
BETA-BHC	NA	NA	NA
DELTA-BHC	NA	NA	NA
DIELDRIN	NA	NA	NA
ENDOSULFAN I	NA	NA	NA
ENDOSULFAN II	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA
ENDRIN	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA
ENDRIN KETONE	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP28-1314	DSY-S-TP28-0507
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
GAMMA-BHC (LINDANE)	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA
HEPTACHLOR	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA
METHOXYCHLOR	NA	NA	NA
PCB-209	NA	NA	NA
SUM OF PCB CONGENERS X 2	NA	NA	NA
TOXAPHENE	NA	NA	NA
METALS (MG/KG)			
ALUMINUM	14300	9240	12800
ANTIMONY	11.7 UJ	8.3 UJ	10.4 UJ
ARSENIC	37.3	7.7 J	13.7 J
BARIUM	11.3	26.2 J	13.7 J
BERYLLIUM	0.44 J	0.35 J	0.35 J
CADMIUM	1.3 UJ	0.48 UJ	0.6 UJ
CALCIUM	1070	744	377
CHROMIUM	12.6	11.9 J	14.2 J
COBALT	18.5	10.8 J	14.3 J
COPPER	26	18.6 J	22.1 J
IRON	35000	20800	27100
LEAD	21.2	8 J	15.4 J
MAGNESIUM	4530	3190	3400
MANGANESE	514	320 J	302 J
MERCURY	0.05 U	0.05 U	0.06 U

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP28-1314	DSY-S-TP28-0507
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
NICKEL	30.4	17.9 J	19.1 J
POTASSIUM	241	661	231
SELENIUM	0.9 U	0 R	0 R
SILVER	1.6 J	0.96 UJ	1.2 UJ
SODIUM	50.4 UJ	26.2 UJ	0 R
THALLIUM	1.4 U	0 R	0 R
VANADIUM	18.8 J	13.7	16.4
ZINC	66.1	42.5 J	44.4 J
MISCELLANEOUS PARAMETERS (UG/KG)			
DIBUTYLTIN	NA	NA	NA
MONOBUTYLTIN	NA	NA	NA
TETRABUTYLTIN	NA	NA	NA
TRIBUTYLTIN	NA	NA	NA
PETROLEUM HYDROCARBONS (MG/KG)			
CREOSOTE	NA	NA	NA
TCLP METALS (UG/L)			
ARSENIC	NA	NA	NA
BARIUM	NA	NA	NA
CADMIUM	NA	NA	NA
CHROMIUM	NA	NA	NA
LEAD	NA	NA	NA
MERCURY	NA	NA	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SUBSURFACE SOIL (SO_SB_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-1213	DSY-S-TP28-1314	DSY-S-TP28-0507
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	12 FT	13 FT	5 FT
BOTTOM DEPTH	13 FT	14 FT	7 FT
SACODE	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM
SELENIUM	NA	NA	NA
SILVER	NA	NA	NA

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-MW03-0_501	DSY-S-MW04-SS01	DSY-S-MW05-SS01	DSY-S-MW05-SS01-D	DSY-S-MW06-SS01	DSY-S-MW07-0001	DSY-S-MW08-SS01	DSY-S-MW09-0001	MW09TP01	DSY-S-MW11-0001	DSY-S-MW12-SS01	DSY-SB-11-0002
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-06	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-11	DSY-MW-12	DSY-SB-11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,1,2,2-TETRACHLOROETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,1,2-TRICHLOROETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,1-DICHLOROETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,1-DICHLOROETHENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,2-DICHLOROETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
1,2-DICHLOROPROPANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
2-BUTANONE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
2-HEXANONE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
4-METHYL-2-PENTANONE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
ACETONE	11 U	11 U	10 U	11 U	12 U	12 U	11 U	28 U	11 U	NA	41 U	11 U	11 U
BENZENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
BROMODICHLOROMETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
BROMOFORM	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
BROMOMETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CARBON DISULFIDE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CARBON TETRACHLORIDE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CHLOROBENZENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CHLORODIBROMOMETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CHLOROETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CHLOROFORM	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
CHLOROMETHANE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-MW03-0_501	DSY-S-MW04-SS01	DSY-S-MW05-SS01	DSY-S-MW05-SS01-D	DSY-S-MW06-SS01	DSY-S-MW07-0001	DSY-S-MW08-SS01	DSY-S-MW09-0001	MW09TP01	DSY-S-MW11-0001	DSY-S-MW12-SS01	DSY-SB-11-0002
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-06	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-11	DSY-MW-12	DSY-SB-11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
ETHYLBENZENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
METHYLENE CHLORIDE	11 U	12 U	17 U	23 U	18 U	30 U	15 U	31 U	31 U	NA	18 U	11 U	18 U
STYRENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
TETRACHLOROETHENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
TOLUENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
TOTAL 1,2-DICHLOROETHENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
TOTAL XYLENES	11 U	11 U	10 U	11 U	11 U	11 U	11 U	3 J	11 U	NA	1 J	11 U	11 U
TRANS-1,3-DICHLOROPROPENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
TRICHLOROETHENE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
VINYL CHLORIDE	11 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	NA	11 U	11 U	11 U
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
1,2-DICHLOROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
1,3-DICHLOROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
1,4-DICHLOROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2,2'-OXYBIS(1-CHLOROPROPANE)	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2,4,5-TRICHLOROPHENOL	890 U	830 U	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 U	1000 UJ
2,4,6-TRICHLOROPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2,4-DICHLOROPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2,4-DIMETHYLPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2,4-DINITROPHENOL	890 U	830 UJ	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	0 R	1000 UJ

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-MW03-0_501	DSY-S-MW04-SS01	DSY-S-MW05-SS01	DSY-S-MW05-SS01-D	DSY-S-MW06-SS01	DSY-S-MW07-0001	DSY-S-MW08-SS01	DSY-S-MW09-0001	MW09TP01	DSY-S-MW11-0001	DSY-S-MW12-SS01	DSY-SB-11-0002
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-06	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-11	DSY-MW-12	DSY-SB-11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2,6-DINITROTOLUENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2-CHLORONAPHTHALENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2-CHLOROPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2-METHYLNAPHTHALENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2-METHYLPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
2-NITROANILINE	890 U	830 U	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 U	1000 UJ
2-NITROPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
3,3'-DICHLOROBENZIDINE	350 UJ	330 U	350 U	330 UJ	330 UJ	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
3-NITROANILINE	890 U	830 U	870 U	840 UJ	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 UJ	1000 UJ
4,6-DINITRO-2-METHYLPHENOL	890 U	830 UJ	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	0 R	1000 UJ
4-BROMOPHENYL PHENYL ETHER	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
4-CHLORO-3-METHYLPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
4-CHLOROANILINE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
4-CHLOROPHENYL PHENYL ETHER	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
4-METHYLPHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
4-NITROANILINE	890 UJ	830 U	870 U	840 UJ	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 U	1000 UJ
4-NITROPHENOL	890 U	830 U	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 U	1000 UJ
ACENAPHTHENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	52 J	360 UJ	NA	350 U	330 U	410 UJ
ACENAPHTHYLENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
ANTHRACENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	110 J	51 J	NA	350 U	330 U	410 UJ
BENZO(A)ANTHRACENE	350 U	330 U	350 U	330 U	330 U	130 J	400 UJ	200 J	470 J	110 J	350 U	330 U	410 UJ

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-MW03-0_501	DSY-S-MW04-SS01	DSY-S-MW05-SS01	DSY-S-MW05-SS01-D	DSY-S-MW06-SS01	DSY-S-MW07-0001	DSY-S-MW08-SS01	DSY-S-MW09-0001	MW09TP01	DSY-S-MW11-0001	DSY-S-MW12-SS01	DSY-SB-11-0002
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-06	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-11	DSY-MW-12	DSY-SB-11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
BENZO(A)PYRENE	350 U	330 U	350 U	330 U	330 U	120 J	400 UJ	170 J	410 J	100 J	350 U	330 U	410 UJ
BENZO(B)FLUORANTHENE	350 U	330 U	350 U	330 U	330 U	180 J	400 UJ	230 J	660 J	140 J	350 U	330 U	410 UJ
BENZO(G,H,I)PERYLENE	350 U	330 U	350 U	330 U	330 U	72 J	400 UJ	88 J	190 J	48 J	350 U	330 U	410 UJ
BENZO(K)FLUORANTHENE	350 U	330 U	350 U	330 U	330 U	86 J	400 UJ	87 J	270 J	76 J	350 U	330 U	410 UJ
BIS(2-CHLOROETHOXY)METHAN E	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
BIS(2-CHLOROETHYL)ETHER	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	46 J	330 U	350 U	330 U	330 U	360 UJ	400 UJ	1200 UJ	360 UJ	3000	350 U	80 J	410 UJ
BUTYL BENZYL PHTHALATE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
CARBAZOLE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	37 J	360 UJ	NA	350 U	330 U	410 UJ
CHRYSENE	350 U	330 U	350 U	330 U	330 U	140 J	400 UJ	220 J	580 J	120 J	350 U	330 U	410 UJ
DIBENZO(A,H)ANTHRACEN E	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	62 J	NA	350 U	330 U	410 UJ
DIBENZOFURAN	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
DIETHYL PHTHALATE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
DIMETHYL PHTHALATE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
DI-N-BUTYL PHTHALATE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	51 J	64 J	NA	350 U	330 U	410 UJ
DI-N-OCTYL PHTHALATE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	62 J	360 UJ	NA	350 U	330 U	410 UJ
FLUORANTHENE	350 U	330 U	350 U	330 U	330 U	300 J	400 UJ	460 J	770 J	180 J	350 U	330 U	410 UJ
FLUORENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	50 J	360 UJ	NA	350 U	330 U	410 UJ
HEXACHLOROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
HEXACHLOROBUTADIENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ

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TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-MW03-0_501	DSY-S-MW04-SS01	DSY-S-MW05-SS01	DSY-S-MW05-SS01-D	DSY-S-MW06-SS01	DSY-S-MW07-0001	DSY-S-MW08-SS01	DSY-S-MW09-0001	MW09TP01	DSY-S-MW11-0001	DSY-S-MW12-SS01	DSY-SB-11-0002
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-06	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-11	DSY-MW-12	DSY-SB-11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
HEXACHLOROCYCLOPENTADIENE	350 U	330 U	350 UJ	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 UJ	410 UJ
HEXACHLOROETHANE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
HIGH MOLECULAR WEIGHT PAHS	350 U	330 U	350 U	330 U	330 U	1329	400 U	1995	4352	982	350 U	330 U	410 U
INDENO(1,2,3-CD)PYRENE	350 U	330 U	350 U	330 U	330 U	71 J	400 UJ	80 J	190 J	48 J	350 U	330 U	410 UJ
ISOPHORONE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
LOW MOLECULAR WEIGHT PAHS	350 U	330 U	350 U	330 U	330 U	120	400 U	632	231	NA	350 U	330 U	410 U
NAPHTHALENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
NITROBENZENE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
N-NITROSO-DI-N-PROPYLAMINE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
N-NITROSODIPHENYLAMINE	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
PENTACHLOROPHENOL	890 U	830 U	870 U	840 U	840 U	910 UJ	1000 UJ	910 UJ	900 UJ	NA	890 U	820 U	1000 UJ
PHENANTHRENE	350 U	330 U	350 U	330 U	330 U	120 J	400 UJ	420 J	180 J	70 J	350 U	330 U	410 UJ
PHENOL	350 U	330 U	350 U	330 U	330 U	360 UJ	400 UJ	360 UJ	360 UJ	NA	350 U	330 U	410 UJ
PYRENE	350 U	330 U	350 U	330 U	330 U	230 J	400 UJ	460 J	750 J	160 J	350 U	330 U	410 UJ
TOTAL PAHS	350 U	330 U	350 U	330 U	330 U	1449	400 U	2627	4583	1052	350 U	330 U	410 U
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
4,4'-DDE	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
4,4'-DDT	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	5.2 J	NA	3.5 U	3.2 U	4.1 U
ALDRIN	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-MW03-0_501	DSY-S-MW04-SS01	DSY-S-MW05-SS01	DSY-S-MW05-SS01-D	DSY-S-MW06-SS01	DSY-S-MW07-0001	DSY-S-MW08-SS01	DSY-S-MW09-0001	MW09TP01	DSY-S-MW11-0001	DSY-S-MW12-SS01	DSY-SB-11-0002
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-06	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-11	DSY-MW-12	DSY-SB-11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
ALPHA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
ALPHA-CHLORDANE	1.8 U	2	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
AROCLOR-1016	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	36 UJ	36 UJ	NA	35 U	32 U	41 U
AROCLOR-1221	70 U	67 U	69 U	66 U	66 U	72 UJ	79 UJ	72 UJ	72 UJ	NA	72 U	64 U	83 U
AROCLOR-1232	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	36 UJ	36 UJ	NA	35 U	32 U	41 U
AROCLOR-1242	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	36 UJ	36 UJ	NA	35 U	32 U	41 U
AROCLOR-1248	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	36 UJ	36 UJ	NA	35 U	32 U	41 U
AROCLOR-1254	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	38 J	36 UJ	NA	35 U	32 U	41 U
AROCLOR-1260	35 U	33 U	35 U	33 U	33 U	36 UJ	40 UJ	36 UJ	36 UJ	NA	35 U	32 U	41 U
BETA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
DELTA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
DIELDRIN	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
ENDOSULFAN I	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
ENDOSULFAN II	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
ENDOSULFAN SULFATE	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
ENDRIN	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	5.7
ENDRIN ALDEHYDE	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
ENDRIN KETONE	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U
GAMMA-BHC (LINDANE)	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
GAMMA-CHLORDANE	1.8 U	2.4	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
HEPTACHLOR	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
HEPTACHLOR EPOXIDE	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	NA	1.8 U	1.7 U	2.1 U
METHOXYCHLOR	18 U	17 U	18 U	17 U	17 U	19 UJ	20 UJ	19 UJ	18 UJ	NA	18 U	17 U	21 U
PCB-209	3.5 U	3.3 UJ	3.5 U	3.3 U	3.3 U	3.6 UJ	4 UJ	3.6 UJ	3.6 UJ	NA	3.5 U	3.2 U	4.1 U

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TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-MW03-0_501	DSY-S-MW04-SS01	DSY-S-MW05-SS01	DSY-S-MW05-SS01-D	DSY-S-MW06-SS01	DSY-S-MW07-0001	DSY-S-MW08-SS01	DSY-S-MW09-0001	MW09TP01	DSY-S-MW11-0001	DSY-S-MW12-SS01	DSY-SB-11-0002
LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-06	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-11	DSY-MW-12	DSY-SB-11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
SUM OF PCB CONGENERS X 2	3.5 U	3.3 U	3.5 U	3.3 U	3.3 U	3.6 U	4 U	3.6 U	3.6 U	NA	3.5 U	3.2 U	4.1 U
TOXAPHENE	180 U	170 U	180 U	170 U	170 U	190 UJ	200 UJ	190 UJ	180 UJ	NA	180 U	170 U	210 U
METALS (MG/KG)													
ALUMINUM	4620	4460 J	3440	8060	8300	12300	13100	10100	5260	NA	4220 J	4690	4300
ANTIMONY	9.7 UJ	10.2 U	10.2 UJ	9.4 UJ	8.4 UJ	10.6 UJ	10.6 UJ	9.8 UJ	10.6 UJ	NA	11.1 U	10 UJ	10.7 UJ
ARSENIC	3	3.3	4.9	5.8	4.9	10.4	23.9	19.2	5.3	13	3.8	2.8	2.9 U
BARIUM	5.4	5.9	6.4	12.5	12.4	14.8 J	12.1	67	12.9	180	9.3	4.1 U	7.2
BERYLLIUM	0.19 U	0.2 U	0.2 U	0.26 J	0.26 J	0.45	0.38 J	3.5	0.2 U	NA	0.21 U	0.19 U	0.21 U
CADMIUM	0.56 U	0.59 U	0.59 U	0.54 U	0.48 U	0.61 U	0.61 U	0.57 U	0.61 U	13	0.64 U	0.58 U	0.62 UJ
CALCIUM	412	735	325	762 J	662 J	1180	1130 J	2790	626	NA	91.1 U	533	407 J
CHROMIUM	7.8	8.8	6.9 UJ	10	9.6	15.8 J	15.8	40.2 J	13.7 J	130	6.5 U	7.4	6.7
COBALT	4.4	3.5 U	4.6	9.3	8.6	22.7	14.7	23.9	7	NA	8	2.6	4.6 U
COPPER	8.9	13.6 J	9.2	15.2	15.1	30.2	19.5	262	25.5	NA	15.7 J	3.1	8
IRON	12800	13100 J	12100	18000	19000	30600	31000	32900	16900	NA	11900 J	11500	12900
LEAD	3.7 J	20.1	7 J	5.8 J	21.2 J	18.1 J	9.2 J	189 J	23.4 J	63	4.8	2.3 J	8 J
MAGNESIUM	1850	1710	1350	2920	3010	4090	3860	2830	2150	NA	1320	1820	1700
MANGANESE	137 J	111	149	323	272	619	448	489	307	NA	268	81.4 J	135 J
MERCURY	0.05 U	0.06	0.04 U	0.05 U	0.05 U	0.05 U	0.12	0.07	0.05 U	NA	0.05 U	0.05 U	0.05 U
NICKEL	13.1 J	9.7 J	8.2	14.5	15.3	24.9	24.9	113	17.8	NA	9.4 J	9.8 J	11 U
POTASSIUM	252	265	209	341	391	282	241	381	261	NA	225	241	250
SELENIUM	0.78 J	0.78 U	0.79 UJ	0.72 U	0.65 U	0.82 U	0.82 U	0.75 U	0.81 U	3	0.85 U	1 J	0.83 UJ
SILVER	1.1 UJ	1.2 UJ	1.2 UJ	1.1 UJ	0.97 UJ	1.2 UJ	1.2 UJ	1.1 UJ	1.2 UJ	NA	1.3 UJ	1.2 UJ	1.2 UJ
SODIUM	18.7 U	39.2 U	16.5 UJ	51.3 U	52.1 U	0 R	22.6 UJ	163 J	20.5 U	NA	24.6 U	31.4 U	35.6 U
THALLIUM	1.1 UJ	1.2 UJ	1.2 U	1.1 UJ	0.97 UJ	1.2 UJ	1.2 UJ	1.1 UJ	1.2 UJ	NA	1.3 UJ	1.2 UJ	1.2 UJ

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FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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LOCATION ID	DSY-MW-02	DSY-MW-03	DSY-MW-04	DSY-MW-05	DSY-MW-05	DSY-MW-06	DSY-MW-07	DSY-MW-08	DSY-MW-09	DSY-MW-09	DSY-MW-11	DSY-MW-12	DSY-SB-11
SAMPLE DATE	08/08/96	08/05/96	08/12/96	08/19/96	08/19/96	08/30/96	08/14/96	08/27/96	08/28/96	01/01/00	07/31/96	08/06/96	09/05/96
TOP DEPTH	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0.5 FT	0 FT	0.5 FT	0 FT	0 FT	0 FT	0.5 FT	0 FT
BOTTOM DEPTH	1.5 FT	1 FT	1.5 FT	1.5 FT	1.5 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	1 FT	1.5 FT	2 FT
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VANADIUM	7.4	7.7	6.6	8.6	8.9	14.5	14.5	13.1	16.7	NA	6.4	7.4	8.4
ZINC	28.8	49.2	22.8	32.7 J	34 J	88.5 J	54.8 J	831 J	175 J	NA	22.8	22.8	26.4
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 U	50 U	50 U	49 U	50 U	49 U	50 U	50 UJ	49 UJ	NA	50 UJ	50 U	50 UJ
MONOBUTYLTIN	50 U	50 U	50 U	49 U	50 U	49 U	50 U	50 UJ	49 UJ	NA	50 UJ	50 U	50 UJ
TETRABUTYLTIN	50 U	50 U	50 U	49 U	50 U	49 U	50 U	50 UJ	49 UJ	NA	50 UJ	50 U	50 UJ
TRIBUTYLTIN	50 U	50 U	50 U	49 U	50 U	49 U	50 U	6.9 J	49 UJ	NA	50 UJ	50 U	50 UJ
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	77 UJ	81 U	61 U	58 U	65 U	72	70 U	270	77	NA	77 UJ	83 U	84 U
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA	NA	55	NA	NA	NA
TCLP METALS (UG/L)													
ARSENIC	4 U	4 U	4 U	4 U	4.6 J	4 U	5.7 J	6.3 UJ	4 U	NA	4 U	4 U	4.4 J
BARIUM	609	125 U	278	683 U	634 U	121 U	724 U	272 U	129 U	NA	112 U	592	150 U
CADMIUM	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 J	3 U	NA	3 U	3 U	3 U
CHROMIUM	6 U	6 U	6 U	6 U	6 U	13.6	6 U	8.7 J	6 U	NA	6 U	6 U	40.5 J
LEAD	1 U	1 U	5.7	1 U	1 U	6.2 UJ	1.8 UJ	81.3 J	16.4 J	NA	1 U	1.1 UJ	4.5 U
MERCURY	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 UJ	0.1 U
SELENIUM	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	NA	4 U	4 U	4 U
SILVER	6 U	6 UJ	6 U	6.1 UJ	7.5 UJ	7.6 UJ	6 U	6 U	6 U	NA	6.2 UJ	6 U	18.6 UJ

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-TP07-0001	DSY-S-TP08-0001	DSY-S-TP08-0001-D	DSY-S-TP09-0001	DSY-S-TP10-0001	DSY-S-TP11-0001	B6-S1
LOCATION ID	DSY-MW-02	DSY-TP-07	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-10	DSY-TP-11	DSY-TP-14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)								
1,1,1-TRICHLOROETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,1,2,2-TETRACHLOROETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,1,2-TRICHLOROETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,1-DICHLOROETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,1-DICHLOROETHENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,2-DICHLOROETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
1,2-DICHLOROPROPANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
2-BUTANONE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
2-HEXANONE	11 U	11 U	11 U	10 U	11 UJ	10 U	11 U	NA
4-METHYL-2-PENTANONE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
ACETONE	11 U	26 U	19 U	20 U	11 U	10 U	11 U	NA
BENZENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
BROMODICHLOROMETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
BROMOFORM	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
BROMOMETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CARBON DISULFIDE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CARBON TETRACHLORIDE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CHLOROBENZENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CHLORODIBROMOMETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CHLOROETHANE	11 U	11 UJ	11 UJ	10 UJ	11 U	10 U	11 U	NA
CHLOROFORM	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
CHLOROMETHANE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA

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TABLE
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FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-TP07-0001	DSY-S-TP08-0001	DSY-S-TP08-0001-D	DSY-S-TP09-0001	DSY-S-TP10-0001	DSY-S-TP11-0001	B6-S1
LOCATION ID	DSY-MW-02	DSY-TP-07	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-10	DSY-TP-11	DSY-TP-14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
ETHYLBENZENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
METHYLENE CHLORIDE	11 U	11 U	11 U	11 U	11 U	10 U	11 U	NA
STYRENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
TETRACHLOROETHENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
TOLUENE	11 U	1 J	2 J	1 J	11 U	10 U	11 U	NA
TOTAL 1,2-DICHLOROETHENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
TOTAL XYLENES	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
TRANS-1,3-DICHLOROPROPENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
TRICHLOROETHENE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
VINYL CHLORIDE	11 U	11 U	11 U	10 U	11 U	10 U	11 U	NA
SEMIVOLATILES (UG/KG)								
1,2,4-TRICHLOROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
1,2-DICHLOROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
1,3-DICHLOROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
1,4-DICHLOROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,4,5-TRICHLOROPHENOL	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA
2,4,6-TRICHLOROPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,4-DICHLOROPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,4-DIMETHYLPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,4-DINITROPHENOL	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA

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TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-TP07-0001	DSY-S-TP08-0001	DSY-S-TP08-0001-D	DSY-S-TP09-0001	DSY-S-TP10-0001	DSY-S-TP11-0001	B6-S1
LOCATION ID	DSY-MW-02	DSY-TP-07	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-10	DSY-TP-11	DSY-TP-14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2,6-DINITROTOLUENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2-CHLORONAPHTHALENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2-CHLOROPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2-METHYLNAPHTHALENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2-METHYLPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
2-NITROANILINE	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA
2-NITROPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
3,3'-DICHLOROBENZIDINE	350 UJ	1700 U	350 UJ	340 UJ	710 U	360 UJ	350 U	NA
3-NITROANILINE	890 U	4200 U	870 UJ	850 U	1800 U	900 UJ	870 U	NA
4,6-DINITRO-2-METHYLPHENOL	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA
4-BROMOPHENYL PHENYL ETHER	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
4-CHLORO-3-METHYLPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
4-CHLOROANILINE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
4-CHLOROPHENYL PHENYL ETHER	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
4-METHYLPHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
4-NITROANILINE	890 UJ	4200 U	870 U	850 UJ	1800 U	900 U	870 U	NA
4-NITROPHENOL	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA
ACENAPHTHENE	350 U	1700 U	350 U	340 U	710 U	46 J	350 U	NA
ACENAPHTHYLENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
ANTHRACENE	350 U	1700 U	350 U	340 U	710 U	65 J	350 U	NA
BENZO(A)ANTHRACENE	350 U	170 J	350 U	340 U	710 U	250 J	350 U	42 J

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TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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LOCATION ID	DSY-MW-02	DSY-TP-07	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-10	DSY-TP-11	DSY-TP-14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
BENZO(A)PYRENE	350 U	200 J	350 U	340 U	710 U	210 J	350 U	NA
BENZO(B)FLUORANTHENE	350 U	410 J	36 J	77 J	710 U	340 J	350 U	50 J
BENZO(G,H,I)PERYLENE	350 U	1700 U	350 U	340 U	710 U	160 J	350 U	NA
BENZO(K)FLUORANTHENE	350 U	1700 U	350 U	340 U	710 U	140 J	350 U	NA
BIS(2-CHLOROETHOXY)METHAN E	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
BIS(2-CHLOROETHYL)ETHER	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
BIS(2-ETHYLHEXYL)PHTHALATE	46 J	8700	1600 U	380 U	2700 U	930 U	350 U	NA
BUTYL BENZYL PHTHALATE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
CARBAZOLE	350 U	1700 U	350 U	340 U	710 U	56 J	350 U	NA
CHRYSENE	350 U	310 J	350 U	41 J	710 U	290 J	350 U	45 J
DIBENZO(A,H)ANTHRACEN E	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
DIBENZOFURAN	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
DIETHYL PHTHALATE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
DIMETHYL PHTHALATE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
DI-N-BUTYL PHTHALATE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
DI-N-OCTYL PHTHALATE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
FLUORANTHENE	350 U	1700 U	50 J	100 J	710 U	470	350 U	82 J
FLUORENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
HEXACHLOROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
HEXACHLOROBUTADIENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA

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TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-TP07-0001	DSY-S-TP08-0001	DSY-S-TP08-0001-D	DSY-S-TP09-0001	DSY-S-TP10-0001	DSY-S-TP11-0001	B6-S1
LOCATION ID	DSY-MW-02	DSY-TP-07	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-10	DSY-TP-11	DSY-TP-14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
HEXACHLOROCYCLOPENTADIENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 UJ	NA
HEXACHLOROETHANE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
HIGH MOLECULAR WEIGHT PAHS	350 U	1410	158	290	710 U	2570	350 U	277
INDENO(1,2,3-CD)PYRENE	350 U	1700 U	350 U	340 U	710 U	150 J	350 U	NA
ISOPHORONE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
LOW MOLECULAR WEIGHT PAHS	350 U	1700 U	36	47	710 U	461	350 U	NA
NAPHTHALENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
NITROBENZENE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
N-NITROSO-DI-N-PROPYLAMINE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
N-NITROSODIPHENYLAMINE	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
PENTACHLOROPHENOL	890 U	4200 U	870 U	850 U	1800 U	900 U	870 U	NA
PHENANTHRENE	350 U	1700 U	36 J	47 J	710 U	350 J	350 U	60 J
PHENOL	350 U	1700 U	350 U	340 U	710 U	360 U	350 U	NA
PYRENE	350 U	320 J	72 J	72 J	710 U	560	350 U	58 J
TOTAL PAHS	350 U	1410	194	337	710 U	3031	350 U	337
PESTICIDES/PCBS (UG/KG)								
4,4'-DDD	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
4,4'-DDE	3.5 U	3.4 U	3.4 UJ	4.5 J	3.6 UJ	3.5 U	3.4 UJ	NA
4,4'-DDT	3.5 U	3.4 U	8.9	8.3	3.6 UJ	5	3.4 UJ	NA
ALDRIN	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA

GRAY SHADING-DETECTED;
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FORMER DEREKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-TP07-0001	DSY-S-TP08-0001	DSY-S-TP08-0001-D	DSY-S-TP09-0001	DSY-S-TP10-0001	DSY-S-TP11-0001	B6-S1
LOCATION ID	DSY-MW-02	DSY-TP-07	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-10	DSY-TP-11	DSY-TP-14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
ALPHA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
ALPHA-CHLORDANE	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
AROCLOR-1016	35 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1221	70 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1232	35 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1242	35 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1248	35 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1254	35 U	34 U	34 U	34 U	36 UJ	35 U	34 UJ	NA
AROCLOR-1260	35 U	34 U	34 U	34 U	36 UJ	24 J	34 UJ	NA
BETA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
DELTA-BHC	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
DIELDRIN	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
ENDOSULFAN I	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
ENDOSULFAN II	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
ENDOSULFAN SULFATE	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
ENDRIN	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
ENDRIN ALDEHYDE	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
ENDRIN KETONE	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA
GAMMA-BHC (LINDANE)	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
GAMMA-CHLORDANE	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	3.9	1.8 UJ	NA
HEPTACHLOR	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	4.5	1.8 UJ	NA
HEPTACHLOR EPOXIDE	1.8 U	1.7 U	1.8 U	1.7 U	1.8 UJ	1.8 U	1.8 UJ	NA
METHOXYCHLOR	18 U	17 U	18 U	17 U	18 UJ	18 U	18 UJ	NA
PCB-209	3.5 U	3.4 U	3.4 U	3.4 U	3.6 UJ	3.5 U	3.4 UJ	NA

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ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-TP07-0001	DSY-S-TP08-0001	DSY-S-TP08-0001-D	DSY-S-TP09-0001	DSY-S-TP10-0001	DSY-S-TP11-0001	B6-S1
LOCATION ID	DSY-MW-02	DSY-TP-07	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-10	DSY-TP-11	DSY-TP-14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
SUM OF PCB CONGENERS	3.5 U	3.4 U	3.4 U	3.4 U	3.6 U	3.5 U	3.4 U	NA
X 2								
TOXAPHENE	180 U	170 U	180 U	170 U	180 UJ	180 U	180 UJ	NA
METALS (MG/KG)								
ALUMINUM	4620	4930	5910	6340	11300	10000	12100	NA
ANTIMONY	9.7 UJ	8.2 UJ	8.9 UJ	9.1 UJ	9.9 UJ	9.6 UJ	8 UJ	NA
ARSENIC	3	3.9	4.9	7.4	23.6	15.8	24.4	13
BARIUM	5.4	8.9	46.8	42	18	28.1	17.1	19
BERYLLIUM	0.19 U	0.18 J	0.21 J	0.24 J	0.44	0.54	0.41 J	NA
CADMIUM	0.56 U	0.47 U	0.52 U	0.53 U	0.57 U	0.55 U	0.97 J	1.4
CALCIUM	412	521	632	677	571	1030	742	NA
CHROMIUM	7.8	12.3	15	16	16	18.4	15.6	10
COBALT	4.4	5.4	7.9	8.6	21.4	13.5	14.4 J	NA
COPPER	8.9	16.8	26.7	26.9	26.4	35	25.6	NA
IRON	12800	14500	19500	21100	37200	26700	31800	NA
LEAD	3.7 J	17.2 J	52.8 J	50.2 J	12.8 J	62.5 J	10.3	18
MAGNESIUM	1850	1800	2080	2190	3380	2850	3360	NA
MANGANESE	137 J	195	291	310	597	448	445 J	NA
MERCURY	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.09 U	NA
NICKEL	13.1 J	12.6 J	16.3 J	18.2 J	28.2	26.7	23.7	NA
POTASSIUM	252	227	319	336	331	374	341	NA
SELENIUM	0.78 J	0.63 U	0.69 U	0.7 U	0.76 U	0.74 U	0.87 J	NA
SILVER	1.1 UJ	0.95 UJ	1 UJ	1.1 UJ	1.1 UJ	1.1 UJ	0.92 U	NA
SODIUM	18.7 U	24.8	33.5 J	27.8 J	19 J	75.9 J	61.5 U	NA
THALLIUM	1.1 UJ	0.95 U	1 U	1.1 U	1.1 U	1.1 U	0.92 UJ	NA

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-MW02-SS01	DSY-S-TP07-0001	DSY-S-TP08-0001	DSY-S-TP08-0001-D	DSY-S-TP09-0001	DSY-S-TP10-0001	DSY-S-TP11-0001	B6-S1
LOCATION ID	DSY-MW-02	DSY-TP-07	DSY-TP-08	DSY-TP-08	DSY-TP-09	DSY-TP-10	DSY-TP-11	DSY-TP-14
SAMPLE DATE	08/08/96	07/29/96	07/29/96	07/29/96	07/29/96	07/29/96	07/26/96	01/01/00
TOP DEPTH	0.5 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0.25 FT
BOTTOM DEPTH	1.5 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	0.5 FT
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM
VANADIUM	7.4	10.1 J	12.2 J	13.9 J	20 J	23.2 J	17.8 J	NA
ZINC	28.8	63.6	131	126	75.3	139	51.2	NA
MISCELLANEOUS PARAMETERS (UG/KG)								
DIBUTYLTIN	50 U	50 U	49 U	50 U	50 U	50 U	50 U	NA
MONOBUTYLTIN	50 U	50 U	49 U	50 U	50 UJ	50 U	50 U	NA
TETRABUTYLTIN	50 U	50 U	49 U	50 U	11.4 J	50 U	50 U	NA
TRIBUTYLTIN	50 U	50 U	49 U	50 U	2.1 J	50 U	50 U	NA
PETROLEUM HYDROCARBONS (MG/KG)								
CREOSOTE	77 UJ	51 U	51 U	52 U	53 U	61	49 U	NA
TOTAL PETROLEUM HYDROCARBONS	NA	NA	NA	NA	NA	NA	NA	NA
TCLP METALS (UG/L)								
ARSENIC	4 U	4 U	4 U	4 U	4 U	4 U	4 U	NA
BARIUM	609	90.7	350	456	128	152	87.1 U	NA
CADMIUM	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA
CHROMIUM	6 U	6 U	39.5 J	52.4 J	6 U	6 U	6 U	NA
LEAD	1 U	9.6	90.5	114	2.5 U	41.6	1 U	NA
MERCURY	0.1 UJ	0.53 UJ	0.55 UJ	0.56 UJ	0.55 UJ	0.59 UJ	0.1 UJ	NA
SELENIUM	4 U	5.5 U	5.9 U	5.8 U	4.9 UJ	5 U	4 U	NA
SILVER	6 U	6 U	6 U	6 U	6 U	14.4 UJ	0 R	NA

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP15-0001	DSY-S-TP16-0001	DSY-S-TP17-0001	DSY-S-TP18-0001	DSY-S-TP18-0001-D	DSY-S-TP19-0001	DSY-S-TP20-0001	DSY-S-TP21-0001	DSY-S-TP22-0001	DSY-S-TP23-0001	DSY-S-TP26-0001	DSY-S-TP27-0001
LOCATION ID	DSY-TP-12	DSY-TP-15	DSY-TP-16	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-20	DSY-TP-21	DSY-TP-22	DSY-TP-23	DSY-TP-26	DSY-TP-27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
VOLATILES (UG/KG)													
1,1,1-TRICHLOROETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1,2,2-TETRACHLOROETHANE	11 U	11 U	12 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1,2-TRICHLOROETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1-DICHLOROETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1-DICHLOROETHENE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,2-DICHLOROETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,2-DICHLOROPROPANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
2-BUTANONE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
2-HEXANONE	11 U	11 U	12 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
4-METHYL-2-PENTANONE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
ACETONE	11 U	11 U	11 U	11 U	110	120	100	77	110	75	92 J	11 U	11 U
BENZENE	11 U	11 U	1 J	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
BROMODICHLOROMETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
BROMOFORM	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
BROMOMETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CARBON DISULFIDE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CARBON TETRACHLORIDE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CHLOROBENZENE	11 U	11 U	3 J	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CHLORODIBROMOMETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CHLOROETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CHLOROFORM	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
CHLOROMETHANE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP15-0001	DSY-S-TP16-0001	DSY-S-TP17-0001	DSY-S-TP18-0001	DSY-S-TP18-0001-D	DSY-S-TP19-0001	DSY-S-TP20-0001	DSY-S-TP21-0001	DSY-S-TP22-0001	DSY-S-TP23-0001	DSY-S-TP26-0001	DSY-S-TP27-0001
LOCATION ID	DSY-TP-12	DSY-TP-15	DSY-TP-16	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-20	DSY-TP-21	DSY-TP-22	DSY-TP-23	DSY-TP-26	DSY-TP-27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
ETHYLBENZENE	11 U	11 U	12 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
METHYLENE CHLORIDE	11 U	11 U	18 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
STYRENE	11 U	11 U	12 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
TETRACHLOROETHENE	11 U	11 U	12 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
TOLUENE	11 U	11 U	2 J	11 U	11 U	1 J	1 J	2 J	1 J	11 U	4 J	11 U	11 U
TOTAL 1,2-DICHLOROETHENE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
TOTAL XYLENES	11 U	11 U	12 UJ	11 U	11 U	11 U	11 U	11 U	11 U	11 U	2 J	11 U	11 U
TRANS-1,3-DICHLOROPROPENE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
TRICHLOROETHENE	11 U	11 U	2 J	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
VINYL CHLORIDE	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
SEMIVOLATILES (UG/KG)													
1,2,4-TRICHLOROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
1,2-DICHLOROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
1,3-DICHLOROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
1,4-DICHLOROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2,2'-OXYBIS(1-CHLOROPROPANE)	350 U	180 J	12000 U	350 UJ	380 U	39 J	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2,4,5-TRICHLOROPHENOL	880 U	930 UJ	29000 U	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 UJ	870 U
2,4,6-TRICHLOROPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2,4-DICHLOROPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2,4-DIMETHYLPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2,4-DINITROPHENOL	880 UJ	930 UJ	29000 U	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 UJ	870 U

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP15-0001	DSY-S-TP16-0001	DSY-S-TP17-0001	DSY-S-TP18-0001	DSY-S-TP18-0001-D	DSY-S-TP19-0001	DSY-S-TP20-0001	DSY-S-TP21-0001	DSY-S-TP22-0001	DSY-S-TP23-0001	DSY-S-TP26-0001	DSY-S-TP27-0001
LOCATION ID	DSY-TP-12	DSY-TP-15	DSY-TP-16	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-20	DSY-TP-21	DSY-TP-22	DSY-TP-23	DSY-TP-26	DSY-TP-27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-DINITROTOLUENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2,6-DINITROTOLUENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2-CHLORONAPHTHALENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2-CHLOROPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2-METHYLNAPHTHALENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2-METHYLPHENOL	350 U	370 UJ	12000 U	83 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
2-NITROANILINE	880 U	930 UJ	29000 U	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 UJ	870 U
2-NITROPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
3,3'-DICHLOROBENZIDINE	350 U	370 UJ	12000 UJ	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
3-NITROANILINE	880 U	930 UJ	29000 UJ	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 UJ	870 U
4,6-DINITRO-2-METHYLPHENOL	880 U	930 UJ	29000 U	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 UJ	870 U
4-BROMOPHENYL PHENYL ETHER	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
4-CHLORO-3-METHYLPHENOL	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
4-CHLOROANILINE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
4-CHLOROPHENYL PHENYL ETHER	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
4-METHYLPHENOL	350 U	370 UJ	12000 U	500 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
4-NITROANILINE	880 U	930 UJ	29000 UJ	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 UJ	870 U
4-NITROPHENOL	880 UJ	930 UJ	29000 U	880 UJ	950 U	950 U	950 UJ	960 UJ	930 UJ	910 UJ	930 UJ	890 UJ	870 U
ACENAPHTHENE	350 U	92 J	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
ACENAPHTHYLENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP15-0001	DSY-S-TP16-0001	DSY-S-TP17-0001	DSY-S-TP18-0001	DSY-S-TP18-0001-D	DSY-S-TP19-0001	DSY-S-TP20-0001	DSY-S-TP21-0001	DSY-S-TP22-0001	DSY-S-TP23-0001	DSY-S-TP26-0001	DSY-S-TP27-0001
LOCATION ID	DSY-TP-12	DSY-TP-15	DSY-TP-16	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-20	DSY-TP-21	DSY-TP-22	DSY-TP-23	DSY-TP-26	DSY-TP-27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
ANTHRACENE	350 U	130 J	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
BENZO(A)ANTHRACENE	350 U	410 J	12000 U	140 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	60 J	350 U
BENZO(A)PYRENE	350 U	86 J	12000 U	140 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	50 J	350 U
BENZO(B)FLUORANTHENE	350 U	410 J	12000 U	230 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	66 J	350 U
BENZO(G,H,I)PERYLENE	350 U	110 J	12000 U	130 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U	350 U
BENZO(K)FLUORANTHENE	350 U	360 J	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U	350 U
BIS(2-CHLOROETHOXY)METHAN E	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
BIS(2-CHLOROETHYL)ETHER	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
BIS(2-ETHYLHEXYL)PHTHALATE	350 U	370 UJ	12000 U	350 UJ	150 J	65 J	66 J	44 J	68 J	65 J	110 J	350 UJ	350 U
BUTYL BENZYL PHTHALATE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
CARBAZOLE	350 U	97 J	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
CHRYSENE	350 U	420 J	12000 U	120 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	46 J	350 U
DIBENZO(A,H)ANTHRACEN E	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U	350 U
DIBENZOFURAN	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
DIETHYL PHTHALATE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
DIMETHYL PHTHALATE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
DI-N-BUTYL PHTHALATE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
DI-N-OCTYL PHTHALATE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U	350 U
FLUORANTHENE	350 U	870 J	12000 U	330 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	140 J	350 U
FLUORENE	350 U	65 J	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP15-0001	DSY-S-TP16-0001	DSY-S-TP17-0001	DSY-S-TP18-0001	DSY-S-TP18-0001-D	DSY-S-TP19-0001	DSY-S-TP20-0001	DSY-S-TP21-0001	DSY-S-TP22-0001	DSY-S-TP23-0001	DSY-S-TP26-0001	DSY-S-TP27-0001
LOCATION ID	DSY-TP-12	DSY-TP-15	DSY-TP-16	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-20	DSY-TP-21	DSY-TP-22	DSY-TP-23	DSY-TP-26	DSY-TP-27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
HEXACHLOROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
HEXACHLOROBUTADIENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
HEXACHLOROCYCLOPENTADIENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
HEXACHLOROETHANE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	55 J	370 U	360 U	370 U	350 UJ	350 U
HIGH MOLECULAR WEIGHT PAHS	350 U	3556	1400	1530	380 U	380 U	380 U	380 U	370 U	360 U	370 U	472	350 U
INDENO(1,2,3-CD)PYRENE	350 U	150 J	12000 U	140 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 U	350 U
ISOPHORONE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
LOW MOLECULAR WEIGHT PAHS	350 U	867	12000 U	130	380 U	380 U	380 U	380 U	370 U	360 U	370 U	82	350 U
NAPHTHALENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
NITROBENZENE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
N-NITROSO-DI-N-PROPYLAMINE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
N-NITROSODIPHENYLAMINE	350 U	370 UJ	12000 U	350 UJ	380 U	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
PENTACHLOROPHENOL	880 U	930 UJ	29000 U	880 UJ	950 U	950 U	950 U	960 U	930 U	910 U	930 U	890 UJ	870 U
PHENANTHRENE	350 U	580 J	12000 U	130 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	82 J	350 U
PHENOL	350 U	370 UJ	12000 U	1200 J	170 J	380 U	380 U	380 U	370 U	360 U	370 U	350 UJ	350 U
PYRENE	350 U	740 J	1400 J	300 J	380 U	380 U	380 U	380 U	370 U	360 U	370 U	110 J	350 U
TOTAL PAHS	350 U	4423	1400	1660	380 U	380 U	380 U	380 U	370 U	360 U	370 U	554	350 U
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	3.5 U	4.3	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
4,4'-DDE	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP15-0001	DSY-S-TP16-0001	DSY-S-TP17-0001	DSY-S-TP18-0001	DSY-S-TP18-0001-D	DSY-S-TP19-0001	DSY-S-TP20-0001	DSY-S-TP21-0001	DSY-S-TP22-0001	DSY-S-TP23-0001	DSY-S-TP26-0001	DSY-S-TP27-0001
LOCATION ID	DSY-TP-12	DSY-TP-15	DSY-TP-16	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-20	DSY-TP-21	DSY-TP-22	DSY-TP-23	DSY-TP-26	DSY-TP-27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4,4'-DDT	3.5 U	6.2	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
ALDRIN	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
ALPHA-BHC	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
ALPHA-CHLORDANE	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
AROCLOR-1016	35 U	37 U	39 U	35 U	34 U	35 UJ	33 U	34 U	35 U	34 U	35 U	35 U	34 U
AROCLOR-1221	35 U	37 U	39 U	35 U	34 U	35 UJ	33 U	34 U	35 U	34 U	35 U	35 U	69 U
AROCLOR-1232	35 U	37 U	39 U	35 U	34 U	35 UJ	33 U	34 U	35 U	34 U	35 U	35 U	34 U
AROCLOR-1242	35 U	37 U	39 U	35 U	34 U	35 UJ	33 U	34 U	35 U	34 U	35 U	35 U	34 U
AROCLOR-1248	35 U	37 U	39 U	35 U	34 U	35 UJ	33 U	34 U	35 U	34 U	35 U	35 U	34 U
AROCLOR-1254	35 U	37 U	39 U	35 U	34 U	35 UJ	33 U	34 U	35 U	34 U	35 U	35 U	34 U
AROCLOR-1260	35 U	32 J	24 J	35 U	34 U	35 UJ	33 U	34 U	35 U	34 U	35 U	35 U	34 U
BETA-BHC	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
DELTA-BHC	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
DIELDRIN	3.5 U	3.7 U	16	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
ENDOSULFAN I	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
ENDOSULFAN II	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
ENDOSULFAN SULFATE	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
ENDRIN	3.5 U	3.7 U	26	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
ENDRIN ALDEHYDE	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
ENDRIN KETONE	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
GAMMA-BHC (LINDANE)	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
GAMMA-CHLORDANE	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
HEPTACHLOR	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
HEPTACHLOR EPOXIDE	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 UJ	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
METHOXYCHLOR	18 U	19 U	20 U	18 U	18 U	18 UJ	17 U	17 U	18 U	17 U	18 U	18 U	18 U

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP15-0001	DSY-S-TP16-0001	DSY-S-TP17-0001	DSY-S-TP18-0001	DSY-S-TP18-0001-D	DSY-S-TP19-0001	DSY-S-TP20-0001	DSY-S-TP21-0001	DSY-S-TP22-0001	DSY-S-TP23-0001	DSY-S-TP26-0001	DSY-S-TP27-0001
LOCATION ID	DSY-TP-12	DSY-TP-15	DSY-TP-16	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-20	DSY-TP-21	DSY-TP-22	DSY-TP-23	DSY-TP-26	DSY-TP-27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCB-209	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 UJ	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
SUM OF PCB CONGENERS X 2	3.5 U	3.7 U	3.9 U	3.5 U	3.4 U	3.5 U	3.3 U	3.4 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U
TOXAPHENE	180 U	190 U	200 U	180 U	180 U	180 UJ	170 U	170 U	180 U	170 U	180 U	180 U	180 U
METALS (MG/KG)													
ALUMINUM	13200	12700	8290	5820	5280	5250	4920	5980	3950	4810	7830	3810	3840
ANTIMONY	8.7 UJ	10.4 UJ	11.1 UJ	8.1 UJ	7.9 UJ	9.4 UJ	10.9 UJ	9.7 UJ	8.4 UJ	9.7 UJ	7.8 UJ	9.4 UJ	8 UJ
ARSENIC	20.1	19.3	4.7	3.9	4.2 J	5 J	2.6 J	4.5 J	5.1 J	5.3 J	8.8 J	2.6	3.3 UJ
BARIUM	21.4	24	49.4	14.5	28.6 J	11.1	5.1	13.5	8.3	9.5	15.1 J	13.5	7.1 J
BERYLLIUM	0.42 J	0.47	1.1	0.23 J	0.18 J	0.23 J	0.21 U	0.23 J	0.21 J	0.19 U	0.31 J	0.29 J	0.15 UJ
CADMIUM	0.88 J	1 J	0.85 J	0.75 J	0.45 U	0.54 U	0.63 U	0.56 U	0.49 U	0.56 U	0.45 U	0.54 UJ	0.46 UJ
CALCIUM	1070	957	1780	426	386	353	569	342	324	237	571	674	265
CHROMIUM	18.2	16.8	24.1	11	6.6	7	7.9	7.7	5.2	5.8	9.2	6.4	5.3 J
COBALT	14.4 J	12.2 J	14.7	7.6 J	8	8	3.4	8.6	9.1	7.9	9.8	3.3	6.4 J
COPPER	31.8	29.6	111	23.1	22.9	26.9	4.3	20.8	19.3	18.8	19.3	12.9	16.4 J
IRON	32500	31200	19600	23200	15400	17400	11200	18100	15900	15900	19400	7770	13200
LEAD	14.7	27.4	85.5	26.2	20.6 J	14.8 J	3.7 J	14.2 J	9.5 J	9.8 J	10.8 J	9.7	13.8 J
MAGNESIUM	3970	3430	2290	2310	2150	2140	1870	2210	1610	1840	2570	1170	1490
MANGANESE	421 J	349 J	187	325 J	284 J	299 J	84.1 J	306 J	322 J	259 J	340 J	157	218 J
MERCURY	0.11 U	0.13 U	0.1 U	0.08 U	0.05 U	0.05 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 J	0.09 U	0.05 U
NICKEL	27.1	24.4	68.5	15.6	13 UJ	14 UJ	9.3 UJ	14.4 UJ	14.3 UJ	12.4 UJ	17 J	7.8	8.9 J
POTASSIUM	321	307	483	606	311	382	236	407	297	318	448	397	229
SELENIUM	0.74 J	1.2	0.99 J	0.62 U	0.64 J	0.72 U	0.84 U	0.75 U	0.66 J	0.75 U	0.63 J	0.72 U	0 R
SILVER	1 U	1.2 U	1.3 U	0.93 U	0.91 U	1.1 U	1.3 U	1.1 U	0.97 U	1.1 U	0.9 U	1.1 U	0.92 UJ
SODIUM	69.7 U	40 U	172	87.9	35.8	33.2	34.1	29.7	19.7 J	22.8	32.4	45.1 U	11.7 U

GRAY SHADING-DETECTED;
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TABLE
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FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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LOCATION ID	DSY-TP-12	DSY-TP-15	DSY-TP-16	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-20	DSY-TP-21	DSY-TP-22	DSY-TP-23	DSY-TP-26	DSY-TP-27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
THALLIUM	1 UJ	1.2 UJ	1.3 UJ	0.93 UJ	0.91 UJ	1.1 UJ	1.3 UJ	1.1 UJ	0.97 UJ	1.1 UJ	0.9 UJ	1.1 UJ	0 R
VANADIUM	18.9 J	21.8 J	22.4	13.7 J	9.9 J	9.2	8.6	10.2	7.6	8.4	12.2 J	6.8	6.5
ZINC	70.2	71	883	60	76.4	77.8	48	41	40.6	44.4	42.4	44.3	30.3 J
MISCELLANEOUS PARAMETERS (UG/KG)													
DIBUTYLTIN	50 UJ	50 U	33	50 U	5.2 J	5.3 J	50 U	50 U	50 U	49 UJ	49 UJ	49 U	50 UJ
MONOBUTYLTIN	50 UJ	50 U	33	50 U	50 UJ	49 U	50 U	50 U	50 U	49 UJ	49 UJ	49 U	50 UJ
TETRABUTYLTIN	50 UJ	8.8 J	50 U	50 U	50 UJ	49 U	50 U	2.5 J	3.7 J	5.8 J	3.8 J	49 U	50 UJ
TRIBUTYLTIN	50 UJ	4.8 J	30 J	50 U	3.6 J	49 U	50 U	50 U	50 U	49 UJ	9.9 J	49 U	50 UJ
PETROLEUM HYDROCARBONS (MG/KG)													
CREOSOTE	2000 J	68	4900	170	170	120 U	310	200	170 U	160 U	290	320	61
TCLP METALS (UG/L)													
ARSENIC	4 U	5.3 UJ	6.2 UJ	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
BARIUM	306	186	193	114 U	184	111 U	41.3 U	203	167	110 U	140 U	411	719 U
CADMIUM	3 U	3 U	3.1 UJ	3 U	5.1 UJ	3 U	3 U	3 U	4.2 UJ	3 U	3 U	3 U	3 U
CHROMIUM	6 U	6 U	6.5 UJ	7.1 UJ	10.2 UJ	6.1 UJ	6 U	9.8 UJ	12 UJ	6 U	6.3 UJ	6 U	16.6
LEAD	12.8	21.1	71.8	13.1	12.4	12.1	1.9 UJ	9.7	4.4 U	3.3 U	5.2 U	29	5.7 U
MERCURY	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U
SELENIUM	7.7	4 U	4 U	4	5.1 UJ	5.3 UJ	6.1 UJ	4.3 UJ	5.7 UJ	6.2 UJ	7 UJ	8.1	4 U
SILVER	0 R	0 R	0 R	0 R	6 U	6 U	6 U	6 U	6 U	6 U	6 U	0 R	6 UJ

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

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LOCATION ID	DSY-TP-12	DSY-TP-15	DSY-TP-16	DSY-TP-17	DSY-TP-18	DSY-TP-18	DSY-TP-19	DSY-TP-20	DSY-TP-21	DSY-TP-22	DSY-TP-23	DSY-TP-26	DSY-TP-27
SAMPLE DATE	07/26/96	07/25/96	07/25/96	07/25/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/24/96	07/23/96	07/26/96	08/22/96
TOP DEPTH	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT	1 FT
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC TYPE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP28-0001	DSY-S-TP28-0001-D
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
VOLATILES (UG/KG)			
1,1,1-TRICHLOROETHANE	11 U	11 U	11 U
1,1,2,2-TETRACHLOROETHANE	11 U	11 U	11 UJ
1,1,2-TRICHLOROETHANE	11 U	11 U	11 U
1,1-DICHLOROETHANE	11 U	11 U	11 U
1,1-DICHLOROETHENE	11 U	11 U	11 U
1,2-DICHLOROETHANE	11 U	11 U	11 U
1,2-DICHLOROPROPANE	11 U	11 U	11 U
2-BUTANONE	11 U	11 U	11 U
2-HEXANONE	11 U	11 U	11 UJ
4-METHYL-2-PENTANONE	11 U	11 U	11 UJ
ACETONE	11 U	11 U	11 U
BENZENE	11 U	11 U	11 U
BROMODICHLOROMETHANE	11 U	11 U	11 U
BROMOFORM	11 U	11 U	11 U
BROMOMETHANE	11 U	11 U	11 U
CARBON DISULFIDE	11 U	11 U	11 U
CARBON TETRACHLORIDE	11 U	11 U	11 U
CHLOROBENZENE	11 U	11 U	11 UJ
CHLORODIBROMOMETHANE	11 U	11 U	11 U
CHLOROETHANE	11 U	11 UJ	11 U
CHLOROFORM	11 U	11 U	11 U
CHLOROMETHANE	11 U	11 U	11 U

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP28-0001	DSY-S-TP28-0001-D
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
CIS-1,3-DICHLOROPROPENE	11 U	11 U	11 U
ETHYLBENZENE	11 U	11 U	11 UJ
METHYLENE CHLORIDE	11 U	21 U	13 U
STYRENE	11 U	11 U	11 UJ
TETRACHLOROETHENE	11 U	11 U	11 UJ
TOLUENE	11 U	11 U	11 UJ
TOTAL 1,2-DICHLOROETHENE	11 U	11 U	11 U
TOTAL XYLENES	11 U	11 U	11 UJ
TRANS-1,3-DICHLOROPROPENE	11 U	11 U	11 U
TRICHLOROETHENE	11 U	11 U	11 U
VINYL CHLORIDE	11 U	11 U	11 U
SEMIVOLATILES (UG/KG)			
1,2,4-TRICHLOROBENZENE	350 U	3700 UJ	330 U
1,2-DICHLOROBENZENE	350 U	3700 UJ	330 U
1,3-DICHLOROBENZENE	350 U	3700 UJ	330 U
1,4-DICHLOROBENZENE	350 U	3700 UJ	330 U
2,2'-OXYBIS(1-CHLOROPROPANE)	350 U	3700 UJ	330 U
2,4,5-TRICHLOROPHENOL	880 U	9200 UJ	830 U
2,4,6-TRICHLOROPHENOL	350 U	3700 UJ	330 U
2,4-DICHLOROPHENOL	350 U	3700 UJ	330 U
2,4-DIMETHYLPHENOL	350 U	3700 UJ	330 U
2,4-DINITROPHENOL	880 UJ	9200 UJ	830 U

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP28-0001	DSY-S-TP28-0001-D
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
2,4-DINITROTOLUENE	350 U	3700 UJ	330 U
2,6-DINITROTOLUENE	350 U	3700 UJ	330 U
2-CHLORONAPHTHALENE	350 U	3700 UJ	330 U
2-CHLOROPHENOL	350 U	3700 UJ	330 U
2-METHYLNAPHTHALENE	350 U	3700 UJ	330 U
2-METHYLPHENOL	350 U	3700 UJ	330 U
2-NITROANILINE	880 U	9200 UJ	830 U
2-NITROPHENOL	350 U	3700 UJ	330 U
3,3'-DICHLOROBENZIDINE	350 U	3700 UJ	330 U
3-NITROANILINE	880 U	9200 UJ	830 U
4,6-DINITRO-2-METHYLPHENOL	880 U	9200 UJ	830 U
4-BROMOPHENYL PHENYL ETHER	350 U	3700 UJ	330 U
4-CHLORO-3-METHYLPHENOL	350 U	3700 UJ	330 U
4-CHLOROANILINE	350 U	3700 UJ	330 U
4-CHLOROPHENYL PHENYL ETHER	350 U	3700 UJ	330 U
4-METHYLPHENOL	350 U	3700 UJ	330 U
4-NITROANILINE	880 U	9200 UJ	830 U
4-NITROPHENOL	880 UJ	9200 UJ	830 U
ACENAPHTHENE	350 U	3700 UJ	37 J
ACENAPHTHYLENE	350 U	3700 UJ	330 U

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP28-0001	DSY-S-TP28-0001-D
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
ANTHRACENE	350 U	3700 UJ	92 J
BENZO(A)ANTHRACENE	350 U	710 J	500
BENZO(A)PYRENE	350 U	680 J	380 J
BENZO(B)FLUORANTHENE	350 U	1000 J	610 J
BENZO(G,H,I)PERYLENE	350 U	3700 UJ	210 J
BENZO(K)FLUORANTHENE	350 U	3700 UJ	210 J
BIS(2-CHLOROETHOXY)METHAN E	350 U	3700 UJ	330 U
BIS(2-CHLOROETHYL)ETHER	350 U	3700 UJ	330 U
BIS(2-ETHYLHEXYL)PHTHALATE	350 U	3700 UJ	330 U
BUTYL BENZYL PHTHALATE	350 U	3700 UJ	330 U
CARBAZOLE	350 U	3700 UJ	52 J
CHRYSENE	350 U	690 J	470
DIBENZO(A,H)ANTHRACEN E	350 U	3700 UJ	330 U
DIBENZOFURAN	350 U	3700 UJ	330 U
DIETHYL PHTHALATE	350 U	3700 UJ	330 U
DIMETHYL PHTHALATE	350 U	3700 UJ	330 U
DI-N-BUTYL PHTHALATE	350 U	3700 UJ	330 U
DI-N-OCTYL PHTHALATE	350 U	3700 UJ	330 U
FLUORANTHENE	350 U	1400 J	920
FLUORENE	350 U	3700 UJ	52 J

GRAY SHADING-DETECTED;
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TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP28-0001	DSY-S-TP28-0001-D
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
HEXACHLOROBENZENE	350 U	3700 UJ	330 U
HEXACHLOROBUTADIENE	350 U	3700 UJ	330 U
HEXACHLOROCYCLOPENTADIENE	350 U	3700 UJ	330 U
HEXACHLOROETHANE	350 U	3700 UJ	330 U
HIGH MOLECULAR WEIGHT PAHS	350 U	6300	4420
INDENO(1,2,3-CD)PYRENE	350 U	520 J	240 J
ISOPHORONE	350 U	3700 UJ	330 U
LOW MOLECULAR WEIGHT PAHS	350 U	730	731
NAPHTHALENE	350 U	3700 UJ	330 U
NITROBENZENE	350 U	3700 UJ	330 U
N-NITROSO-DI-N-PROPYLAMINE	350 U	3700 UJ	330 U
N-NITROSODIPHENYLAMINE	350 U	3700 UJ	330 U
PENTACHLOROPHENOL	880 U	9200 UJ	830 U
PHENANTHRENE	350 U	730 J	550
PHENOL	350 U	3700 UJ	330 U
PYRENE	350 U	1300 J	880
TOTAL PAHS	350 U	7030	5151
PESTICIDES/PCBS (UG/KG)			
4,4'-DDD	3.5 U	3.6 U	3.3 U
4,4'-DDE	3.5 U	22	17

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP28-0001	DSY-S-TP28-0001-D
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
4,4'-DDT	3.5 U	56	45
ALDRIN	1.8 U	1.9 U	1.7 U
ALPHA-BHC	1.8 U	1.9 U	1.7 U
ALPHA-CHLORDANE	1.8 U	7.3	8.9
AROCLOR-1016	35 U	36 U	33 U
AROCLOR-1221	35 U	73 U	66 U
AROCLOR-1232	35 U	36 U	33 U
AROCLOR-1242	35 U	36 U	33 U
AROCLOR-1248	35 U	36 U	33 U
AROCLOR-1254	35 U	36 U	33 U
AROCLOR-1260	35 U	36 U	33 U
BETA-BHC	1.8 U	1.9 U	1.7 U
DELTA-BHC	1.8 U	1.9 U	1.7 U
DIELDRIN	3.5 U	3.6 U	3.3 U
ENDOSULFAN I	1.8 U	1.9 U	1.7 U
ENDOSULFAN II	3.5 U	3.6 U	3.3 U
ENDOSULFAN SULFATE	3.5 U	3.6 U	3.3 U
ENDRIN	3.5 U	3.6 U	3.3 U
ENDRIN ALDEHYDE	3.5 U	3.6 U	3.3 U
ENDRIN KETONE	3.5 U	3.6 U	3.3 U
GAMMA-BHC (LINDANE)	1.8 U	1.9 U	1.7 U
GAMMA-CHLORDANE	1.8 U	1.9 UJ	6.3 J
HEPTACHLOR	1.8 U	1.9 U	1.7 U
HEPTACHLOR EPOXIDE	1.8 U	4.2	2.6
METHOXYCHLOR	18 U	19 U	17 U

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP28-0001	DSY-S-TP28-0001-D
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
PCB-209	3.5 U	3.6 U	3.3 U
SUM OF PCB CONGENERS X 2	3.5 U	3.6 U	3.3 U
TOXAPHENE	180 U	190 U	170 U
METALS (MG/KG)			
ALUMINUM	13200	9100	10200
ANTIMONY	8.7 UJ	9 UJ	10.1 UJ
ARSENIC	20.1	10.9 J	10.8 J
BARIUM	21.4	26.6 J	29.4 J
BERYLLIUM	0.42 J	0.38 J	0.39 J
CADMIUM	0.88 J	0.52 UJ	0.58 UJ
CALCIUM	1070	562	598
CHROMIUM	18.2	12 J	13 J
COBALT	14.4 J	7.3 J	8.1 J
COPPER	31.8	20.4 J	20.7 J
IRON	32500	19100	20300
LEAD	14.7	115 J	109 J
MAGNESIUM	3970	2060	2310
MANGANESE	421 J	314 J	349 J
MERCURY	0.11 U	0.17 U	0.17 U
NICKEL	27.1	14.5 J	17.8 J
POTASSIUM	321	198	247
SELENIUM	0.74 J	0 R	0 R
SILVER	1 U	1 UJ	1.2 UJ
SODIUM	69.7 U	22.5 UJ	34.7 UJ

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TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP28-0001	DSY-S-TP28-0001-D
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM
THALLIUM	1 UJ	0 R	0 R
VANADIUM	18.9 J	39	40
ZINC	70.2	59.6 J	63.4 J
MISCELLANEOUS PARAMETERS (UG/KG)			
DIBUTYLTIN	50 UJ	50 U	49 U
MONOBUTYLTIN	50 UJ	50 U	49 U
TETRABUTYLTIN	50 UJ	50 U	49 U
TRIBUTYLTIN	50 UJ	50 U	49 U
PETROLEUM HYDROCARBONS (MG/KG)			
CREOSOTE	2000 J	130 J	76 J
TCLP METALS (UG/L)			
ARSENIC	4 U	4 U	4 U
BARIUM	306	556 U	648 U
CADMIUM	3 U	3 U	3 U
CHROMIUM	6 U	6 U	10.6 J
LEAD	12.8	71.9	68.6
MERCURY	0.1 UJ	0.2 UJ	0.1 U
SELENIUM	7.7	4.3 UJ	4 U
SILVER	0 R	8.1 UJ	6 UJ

GRAY SHADING-DETECTED;
U-NOT DETECTED; J-QUANTITATION APPROXIMATE; R-REJECTED; NA-NOT ANALYZED

TABLE
ANALYTICAL RESULTS - SURFACE SOIL (SO_SS_PAVED)
FORMER DERECKTOR SHIPYARD, NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
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SAMPLE ID	DSY-S-TP12-0001	DSY-S-TP28-0001	DSY-S-TP28-0001-D
LOCATION ID	DSY-TP-12	DSY-TP-28	DSY-TP-28
SAMPLE DATE	07/26/96	08/21/96	08/21/96
TOP DEPTH	0 FT	0 FT	0 FT
BOTTOM DEPTH	1 FT	1 FT	1 FT
SACODE	NORMAL	ORIG	DUP
QC TYPE	NM	NM	NM